

LAND ECONOMICS

a quarterly journal of

PLANNING, HOUSING & PUBLIC UTILITIES

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NOVEMBER, 1948

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A Reappraisal of Farm Tenure Research[†]

By MAX M. THARP*

LIKE "planning," "freedom," and "democracy," the term "research" has been stretched to cover many things. But this paper is not meant to be a treatise on semantics. Suffice it to say that the concept of land tenure research has been twisted, expanded, or contracted to fit the fixed values and personal predilections of those who are engaged in tenure research, as well as those who merely write about it. There are a few people, obviously not engaged in tenure research, who would so shrink the field that nothing would be left for study. They insist that tenure research by any definition is "meddling" in private affairs, and consequently not a proper occupation for public-employed economists. To another group, a few of whom are actively engaged in the study of tenure, the field of tenure research is interwoven, if not synonymous, with "reform" programs. As special pleaders for

selected groups, i.e., family farmers, non-white operators, share croppers, etc., these professional men have come to envision tenure research as a promotional crusade. Since such contorted and restrictive views are increasingly tending to shape the pattern of tenure research, an attempt to discover the roots of these beliefs is perhaps in order.

At least a part of the apparent misunderstanding of the field of tenure research may be discovered in the writings of professional agricultural economists. Suspecting this, the writer examined a cross section of tenure literature and these are his observations.¹ This review is not intended to single out tenure research for criticism. Its shortcomings are probably no greater than those of other social science disciplines. However, tenure workers should be able to improve their techniques if they build upon the lessons taught by past experi-

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[†]The ideas expressed in this paper do not necessarily represent the views of the Bureau of Agricultural Economics or the Department of Agriculture; they are the sole responsibility of the author. Many suggestions, however, were received from fellow workers in the Division of Land Eco-

nomics. The writer wishes to express his appreciation in particular to W. Robert Parks, William H. Fippin and Claude C. Haren for their many helpful comments and criticisms.

¹For a comprehensive and critical review of tenure research see: Leonard A. Salter, Jr., *A Critical Review of Research in Land Economics* (Minneapolis: University of Minnesota Press, 1948).

ence. It is with this in mind that the writer offers the following appraisal.

One is immediately impressed by the large volume of tenure literature, but is surprised by the small proportion that is based on or backed up by facts and analysis. Much of the literature on the subject has dealt with tenancy, rather than with tenure in its broadest sense. Tenure means "to hold." Thus farm tenure can be construed to mean the right or manner of holding farms. Tenure research, therefore, should be concerned with studying the problems growing out of the various arrangements under which farmers and others hold or control land. A tenure relationship arises out of the dealings and bargainings of man-with-man and man-with-society (groups and institutions) with respect to control, occupancy and use of land. Kelso enumerates four functions of tenure research:

"(1) describing, (2) analyzing the causes, (3) appraising the economic and social significance, and (4) suggesting socially desirable modifications in the various ways in which property rights in farm land are shared between the owner and user."²

Research in farm tenure should be objective and problem-solving.³ This does not mean that there is not a continuing need for descriptive studies. But these studies should present basic relationships and help define and point up strategic problems. Research should help give a better understanding of the effects of tenure arrangements on land use, conservation of resources, agricultural production and social welfare. Analytical evaluations of the economic consequences of changes (technological and political) now taking place in American agriculture are necessary to appraise the accelerating or retarding influences of various tenure

arrangements on these changes as well as the effects of such changes on tenure arrangements themselves.

A review of tenure literature reveals many blank spots in tenure research. In spite of the emphasis given this topic during the last quarter century many fundamental problems remain unsolved and many have not been studied by research workers. Some of the articles on tenure cannot be classified as reports on research because the conclusions are unsupported by facts or logical reasoning. Often they represent the personal viewpoints of the writer, whose efforts to promote or further a definite point of view are immediately apparent. Such articles cannot be classified as being based on research because of the subjective approach and the evidence of a predetermined set of values and conclusions that often unduly influence the author.

There is some evidence to indicate that agricultural policy makers and administrators consider tenure research of only limited importance at the present time. Perhaps this attitude is influenced by the Census reports for 1945. According to this source, the rate of farm tenancy was at its lowest point in over half a century. Along with decreased tenancy there was a big increase in the proportion of farms operated by full owners. Some administrators contend that, because of the existing storehouse of tenure publications, there is little need for further research in this field. This is particularly true as regards tenancy. Consequently, in recent years there has been a shifting of emphasis from tenancy to ownership studies. These latter projects range from surveys of the characteristics of owners to case studies of inheritance practices. The

³ It is doubtful that the "human element" can be totally eliminated from social science research. As Professor Knight has said, "truth itself is a value" ("What is Truth in Economics?" by Frank H. Knight, *The Journal of Political Economy*, Feb. 1940, p. 26). But tenure literature is particularly vulnerable to the charge of subjectivity.

² M. M. Kelso, "Needed Research in Farm Tenancy," *Journal of Farm Economics*, Feb. 1941, p. 291.

rapid rise in farm incomes during the war and postwar years is often inferred to have solved more tenure problems than all past research.

The writer is not in sympathy with those who think high farm incomes alone can solve tenure problems. Undoubtedly, increased incomes in the past few years have enabled many tenants to become owners. Some of these tenants now have unencumbered ownership of adequate-sized farms, but many others have sizable debts (both on real estate and operating capital) or own farms that are too small to endure as economic units under a lower price level and greater competition than exists today. Far from solving tenancy problems, war-inflated incomes have served only to submerge many of them. Should agricultural prices take a drop comparable to that following World War I and many farmers again lose their farms through foreclosure, the reduction in tenancy may prove to have been temporary and the tenure problems of the 1930's will be with us again.

In view of the rapid changes occurring in agriculture, perhaps too much of past tenure research, especially those descriptive studies dealing with situations and trends, offers little information that is useful in solving current problems. These studies frequently used mass statistics to show the situation but offered few clues as to what factors contributed to the situation or what might be done to change it. Such projects dealt largely with static rather than dynamic conditions. Agricultural adjustments arising out of changes in technology, mechanization, labor supply, credit needs and the general selective demand situation for

farm products are creating many new tenure problems that require a more carefully planned problem-solving type of research. A lack of economic analysis of most of the statistics collected in past studies leaves policy makers and administrators without a set of basic principles that would be useful for solving these new problems as they arise.

Why has past tenure research not supplied the tools to help solve current problems? One reason may be the controversial nature of some types of tenure studies. As a consequence research may consciously have been shifted to studies of the non-controversial aspects of tenure.⁴ On the other hand, part of the reason, at least, may be due to the methodology used. Many of the statistical studies fall short of the mark when they are evaluated in terms of relationships or solutions of basic problems. Frequently a great body of unrelated facts is assembled without a carefully thought-through plan for interpretation and analysis. As a result, much of the data are worthless and, at most, they can be used merely as background for a general description of the situation. Maddox, writing in 1937, said:

"It is essentially accurate to say that most of our tenure research has been aimed at giving us an inventory of the existing tenancy situation. . . . It has done little in giving us specific information aimed primarily at aiding in choosing ideals for policy making, or in selecting, among the various alternative courses of action the one best suited for attaining such ideals."⁵

This appraisal is still essentially correct.

If projects of a statistical inventory type were carried out only after a definite procedure for analysis was agreed upon, the collection of facts could be purposeful, and in some cases the same

⁴A discussion of the political science point of view is not intended in this paper. For an appraisal of political influence on research in connection with the Marketing and Research Act, see Charles M. Hardin, "Political Influence and Agricultural Research," *The American Political Science Review*, Aug. 1947.

⁵J. G. Maddox, "Land Tenure Research in a National Land Policy," *Journal of Farm Economics*, Feb. 1937, pp. 107-108.

data might serve not only for description of conditions and trends, but also for cross classification and analysis as well. Two types of publications might result from a single set of such statistics, (1) a descriptive situation-and-trends report, and (2) an analytical interpretation of interrelationships and effects of certain tenure phenomena.

Tenure literature, for the purpose of the present discussion, might be categorized as follows: (1) tenure ideology, (2) situation and trends, (3) economic analysis, (4) policy recommendations, and (5) promotion of reforms. Characteristics of tenure literature falling into these categories are discussed below.

I

Ideological Articles. Writers on this phase of tenure seldom fail to call upon the words and actions of the "founding fathers," particularly Thomas Jefferson, to support their advocacy of "family farms" and other tenure ideals. The historic Ordinance of 1787 is often quoted and interpreted to show that the Nation early adopted a policy favoring family farm ownership. Equality and freedom are discussed as other basic land tenure policy objectives. Much of this literature is historical. It deals with broad evolutionary, and occasionally revolutionary, movements toward supposedly higher levels of civilization and varied concepts of tenure.

Since many of the agricultural economists and sociologists writing about tenure ideals often give the impression that the Nation has a coordinated land policy for promoting family farm ownership, it is necessary to turn to the historians for an appraisal of the origin of this oft repeated notion. True, Jefferson did en-

courage a policy that would promote settlement by family farmers. He did this because he believed that political democracy could not be maintained in the United States unless it rested on a foundation of economic independence. But Alexander Hamilton's policy of administrative expediency won out, and political leaders decided that sales of the public domain in large tracts should be made in order to raise revenue. Consequently, Jefferson's ideal of a free and independent rural citizenry of land-owning farmers, however laudable, was only partially achieved.⁶ More pointedly, was it ever even official government policy?

The Ordinance of 1787 aimed to prevent the perpetuation of estates by prohibition of primogeniture and entails. It also dealt in part with disposition of the public domain. On the whole, however, this document was not favorable to immediate settlement because it required that before farmers could buy land it must be cleared of Indian title and surveyed. Both of these conditions imposed quite formidable obstacles. Even after these conditions were met, 640 acres was the smallest amount available for purchase, and this was to be sold at auction at a minimum price of not less than one dollar per acre. In the competition for the best located and most productive land the settler frequently lost out to the speculator.⁷

The general Preemption Act of 1841 established the right of occupiers to first chance at purchase of land under their control. According to Robbins:

"Preemption . . . was an expedient which a government was forced to adopt so as to make established law and order conform with the lawless and uncontrollable spirit of the American frontier."⁸

The Mississippi Valley Historical Review, Dec. 1931, pp. 333-336.

⁸ *Ibid.*, p. 332.

⁶ See Paul Wallace Gates, "Land Policy and Tenancy in the Prairie States," *The Journal of Economic History*, May 1941, pp. 60-62.

⁷ Roy M. Robbins, "Preemption—A Frontier Triumph,"

Passage of the Preemption Act ushered in a more "liberal" land policy which finally culminated in enactment of the Homestead Act of 1862. This Act was intended to establish owner-operated 160-acre farms, but by 1880 over one-fourth of the Nation's farmers were tenants. Passage of the Homestead Act did not end cash sales and grants. Speculation and land concentration continued, and actual homesteading was generally confined to the less desirable lands distant from railroads and markets.⁹ The lack of restriction on sales of homesteaded land and the commutation clause, which permitted the settler to pay cash for his land after a short period of occupancy, fostered the continued development of tenancy and land concentration.

From this brief sketch of the workings of our early land policy it can be seen that far from the government having a definite policy favoring owner-operation of family farms often the reverse seemed to be true. Such conflicts in tenure policy continue to this day. Too often writers on this phase of tenure enumerate what policy "ought to be," rather than what actually exists. It is not the intention of the writer to disagree with tenure idealists. Ideology is an indispensable political guide but it is questionable whether the continued repetition of subjective tenure ideals by agricultural economists, often under the guise of research, contributes to the solution of tenure problems.

In recent years several agricultural economists have written articles setting

forth a series of tenure goals that policy should seek to implement.¹⁰ These reports are largely announcements of objectives or ends believed by the writers to be of wide, if not universal, application. They sometimes employ the terms "all people" or "all farmers" which have the general effect of being decrees on what is "right" and "good" and clearly true. The presumption is that these pronouncements by experts are made on the basis of previous researches and from their background knowledge of the field. Otherwise they are merely laymen's opinions. Very little attempt has been made to determine the probable economic or social consequences of achieving or failing to achieve such objectives. These goals ought to be further examined in an objective fashion so that policy makers can base their decisions upon research rather than upon mere statements of opinions. Tenure goals should be analyzed by the research worker to point out possible conflicts and to outline expected results from different alternatives. As Ackerman has pointed out:

"The economist may not have the job of determining the goal, but it is necessary for him to analyze the social and economic aspects of all changes from the point of view of the individual and the general welfare. He must study the probable income effects of following alternative tenure systems, and must ascertain the essential inconsistencies among the various aims which society is trying to attain in suggested land tenure reform."¹¹

⁹ Paul Wallace Gates, "The Homestead Law in An Incongruous Land System," *American Historical Review*, July 1936, pp. 654-655.

¹⁰ Some of these statements are included in: (1) Committee on Postwar Agricultural Policy of the Association of Land-Grant Colleges and Universities, *Postwar Agricultural Policy*, October 1944; (2) Marshall D. Harris, "Objectives of Land Tenure Policy," an address given before a meeting of the Caribbean Research Council of the Anglo-American Caribbean Commission, August 1944; (3) North Central Regional Committee on Land Tenure Research, *Improving Farm Tenure in the Midwest*, Illinois Agricultural Experiment

Station, Bulletin 502, Urbana, June 1944; (4) John F. Timmons, "Land Tenure Policy Goals," *The Journal of Land & Public Utility Economics*, May 1943; (5) C. H. Hammar, "The Land Tenure Ideal," *The Journal of Land & Public Utility Economics*, February 1943; (6) Karl Brandt, "Toward a More Adequate Approach to the Farm Tenure Program," *Journal of Farm Economics*, February 1942; (7) Paul V. Maris, "National Land Tenure Objectives," *Land Policy Review*, July 1941; (8) J. G. Maddox, "Land Tenure Research in a National Land Policy," *Journal of Farm Economics*, February 1937; and (9) *Report of President's Committee on Farm Tenancy*, February 1937.

¹¹ Joseph Ackerman, "Status and Appraisal of Research in Farm Tenancy," *Journal of Farm Economics*, Feb. 1941, p. 290.

II

Situations-and-Trends Articles. In this group of writings are found the statistical counts, based upon census data, surveys, case studies, etc. Many of these reports take the form of graphic summaries and present the data in maps, charts and graphs. Usually they carry a brief text pointing out the most significant facts shown in the accompanying map or graph. Occasionally trends are illustrated graphically on maps showing changes from one census period to another, and some carry the particular data back to 1880, the date when the census first reported statistics on tenure. In most cases these studies are factual and objective, but are largely descriptive of mass data rather than analytical.¹² They merely seek to point out the magnitude or prevalence of certain phenomena with respect to geographic location, without regard to interrelationships between different types of data.¹³

Besides the over-all studies of the tenure situation many projects cover only selected phases of the subject. The studies of leasing, inheritance and legal aspects of tenure are largely of the same order as the situation reports. A majority of the leasing studies describe rental arrangements used and give some indication of the prevalence of the various types. As pointed out by Ackerman:

"It is not the objective of most of the projects on farm leases to analyze the economic significance of the various lease systems, but simply to outline the provisions in use by landlord and tenant. . . . None of the present studies point out the effect of the wide difference in

the bargaining power of the landlord and tenant upon the distribution of rights between individuals and upon the economic standing of the two parties. . . . Leasing studies need to be directed toward the isolation of factors in renting *per se* which produce bad effects. They need to give more attention to the economic significance of the various lease forms used."¹⁴

To date, most of the studies of inheritance have been limited to description and case histories of isolated areas. The historical chain of title is often traced and cases are cited to illustrate pertinent points. Most writers have not attempted a thorough economic analysis of their differing ideological concepts. They infer that present inheritance practices are leading to "parcellation" of our farms. However, a case might also be made to show that the opposite is true in certain areas of the Nation.

In the legal studies an attempt has been made to describe the laws that apply to tenure. Both statutory and case law have been reviewed and often the studies have been very thorough and detailed. However, very little analysis has been made to show the way various laws actually work in practice. Perhaps further studies of an analytical character would be fruitful in this area of tenure research, particularly if they analyzed the law in action.

Unfortunately, many of the projects dealing with situations and trends were not designed to isolate general principles that would have widespread application to similar situations in different geographic locations. Perhaps too little attention has been paid to selecting a sample that would be representative of

¹² A survey of tenure studies published between 1933-40 showed that two-fifths were principally descriptive. Similarly a later review of tenure bibliographies showed that three-fifths of the studies published between 1941-45 were primarily descriptive.

¹³ A fundamental defect in most descriptive studies is that they fail accurately to describe the true situation. They deal in mass statistics, averages, frequency groupings, etc., that mask actual relationships. Several writers have recognized

these shortcomings and have pointed out the need for further analysis and a combination of different methods of study. See Robert S. Lynd, *Knowledge For What?* (Princeton: Princeton University Press, 1939), pp. 25-36; L. A. Salter, Jr., "Cross-Sectional and Case Grouping Procedures in Research Analysis," *Journal of Farm Economics*, Nov. 1942, pp. 792-805; Salter, *op. cit.*, p. 45, and Arthur F. Burns, *The Cumulation of Economic Knowledge*, 28th Annual Report of the National Bureau of Economic Research, New York, N. Y.

¹⁴ Ackerman, *op. cit.*, p. 283.

more than the particular area studied. Spot studies should be so designed that the data will contribute to a better understanding of the total picture and not just to a description of a local area with little application elsewhere. It is probable that with better sampling techniques less detailed studies would be necessary, and with better planning the data might be useful for economic analyses as well as description. Such data would be additive—that is, they could serve as a base for further elaboration and analysis and would help in the interpretation of mass statistics.

Often descriptive projects are undertaken without clear-cut objectives. For example, the major objective may be “to collect facts on farm ownership, or leasing, etc.” Such studies proceed on the assumption that no definite plan of analyses is needed; that any great collection of facts should reveal significant conclusions. The result is often a hodgepodge of unrelated statistics that defy interpretation or analysis. Often a little advance planning (such as a clear-cut definition of the problem, tentative hypotheses and preliminary tabulation plans) could save much time and effort that would otherwise be spent in collecting statistics unrelated to the study. Even in cases where objectives are stated, many writers confuse symptoms with causes. The symptoms are described but the causes go unnoticed. With careful planning, situation and trend studies should be very useful in helping to define problems and

in “sharpening the focus” of analytical projects. One writer maintains that the biggest research need is to know how and what research to do, and that the biggest tenure problem is to recognize one when it appears.¹⁵

III

Economic Analysis Studies. These studies seek to isolate and analyze specific causes of known situations. They deal in relationships and attempt to measure effects in economic terms. Assumptions are clearly stated and conclusions are bolstered by adequate and pertinent facts supported by logical inductive and deductive reasoning. Theory is called upon for suitable application in the solution of practical problems. This is a problem-solving type of research which may critically examine preconceived notions and ideological concepts to see how they stand up under a factual analysis. Since tenure research largely neglects this approach, it offers one of the greatest possibilities for significant future tenure projects.¹⁶

While many writers have used the distributive justice concept as their criterion for evaluating tenure systems, few studies have dealt with a systematic analysis of the influences and effects of tenure arrangements on agricultural efficiency, capital allocation and labor productivity. Research of this type will go beyond mere description. It will endeavor to discover forces which are associated with variations in human behaviour.¹⁷

¹⁵ C. A. Wiley, “Tenure Problems and Research Needs in the South,” *Journal of Farm Economics*, Feb. 1937, p. 129.

¹⁶ For some examples of methods used in this type of approach, see: T. W. Schultz, “Capital Rationing, Uncertainty, and Farm-Tenancy Reform,” *The Journal of Political Economy*, June 1940; Rainer Schickele, “Effects of Tenure Systems on Agricultural Efficiency,” *Journal of Farm Economics*, Feb. 1941; and Earl O. Heady, “Economics of Farm Leasing Systems,” *Journal of Farm Economics*, Aug. 1947. The so-called process studies also offer promising possibilities in this area of tenure research. Some examples are reported in: Leonard A. Salter, Jr., “Land Tenure in Process,” Research Bulletin 146, Wisconsin Agricultural

Experiment Station, Madison, Feb. 1943; Kenneth H. Parsons and Elliot O. Waples, “Keeping the Farm in the Family,” Research Bulletin 157, Wisconsin Agricultural Experiment Station, Madison, Sept. 1945; Arthur J. Walrath and W. L. Gibson, Jr., “What Will Become of Your Farm,” Bulletin 169, Virginia Agricultural Extension Service, Blackburg, June 1947; and Arthur J. Walrath and W. L. Gibson, Jr., “Farm Inheritance and Settlement of Estates,” Bulletin 413, Virginia Agricultural Experiment Station, Blackburg, Jan. 1948.

¹⁷ M. M. Kelso, “A Critique of Land Tenure Research,” *The Journal of Land & Public Utility Economics*, Nov. 1934, p. 396.

Analytical studies should provide material that will be useful in developing general principles applicable to the solution of specific tenure problems. They should provide the tools that agricultural research and educational personnel can use to meet various situations as they arise. Mere statistical counts and partial descriptions of tenure situations do not meet this need. Whenever situations change, as they do frequently in a dynamic world, policy makers and administrators often find that research of the type described in II above is inadequate as a basis for guiding their actions. In contrast, analytical studies that result in basic knowledge of relationships can be useful in attacking any related situation because the principles are generally relevant.

IV

Policy Recommendations. Following the economic depression of the early 1930's, many of the articles on tenure dealt with recommendations for improving the tenure system.¹⁸ In most of these recommendations for tenure reform, great stress was placed on legislation as a solution to major problems. Apparently the old American belief that "passing a new law" could cure the "evils" of the tenure system dominated the thinking of the writers. In spite of these writers' sincere yearning for an improved tenure system, they frequently weakened their case by relying too heavily upon value judgments to arrive at conclusions. Analyses of available facts to determine possible con-

sequences that could be expected from such proposals were usually conspicuously absent.

The social philosophy back of many of the tenure recommendations is perhaps desirable. Rural poverty is a disheartening reality and one that is counter to so-called "American tradition." However, it is probable that the statements of tenure conditions that the suggested changes in the system are supposed to correct are overdrawn. Then, too, it is questionable whether many proposed tenure reforms would really correct supposed defects in the situation.¹⁹ For example, some writers vaguely suggest that tenancy should be uprooted in favor of owner-operatorship of the Nation's farms. However, such action might result in conditions quite different from those envisioned by the planners. To be sure, unencumbered ownership by the operator of a full-sized productive farm is highly desirable. But will the suggested reforms bring this about? And if they do, what will be the economic and social costs involved? Larger farms mean fewer farmers, and consequently the displaced people must make a living by some other means. Will this lead to an increase in the population of urban slums and increased competition for positions in the unskilled labor field?

Frequently it is not the ultimate ends sought by most tenure improvement recommendations but the means suggested for attaining them that is questionable. Analytical evaluation of the various assumptions and concepts from which advantageous but here again the many who are not able to secure this type of credit may be in a worse competitive position. Such reforms as graduated land taxes may, in operation, have far different effects than anticipated by those who recommend the practice. There is little evidence that laws giving sharecroppers the legal status of tenants will actually change their bargaining power or their economic and social situation. Factual evidence is lacking to adequately guide policy decisions on these important issues. Research is needed to analyze these and other proposals to point out probable consequences and to outline promising alternatives.

¹⁸ Ackerman, *op. cit.*, p. 280. About one-fifth of the tenure studies during 1933-40 dealt almost exclusively with recommendations. A later tabulation for the period 1941-45 showed that 14 percent of the articles were concerned primarily with recommendations.

¹⁹ Eliminating all farms below a certain minimum "family size" would likely improve the income of the farmers still left in business but it is questionable whether those displaced would find their economic and social position bettered by the shift. Likewise, the few tenants able to acquire farms through 100 percent loans may find ownership

specific recommendations arise is imperative. Alternatives for attaining desirable goals (and these goals should be set by policy makers, not research workers, although researchers are free to suggest goals and to propose alternative lines of action to achieve them) should be outlined and carefully evaluated by researchers to aid legislators and administrators of tenure policy in taking steps to implement them.

It is recognized that many proposed changes in the tenure system go far beyond economic considerations. This is as it should be. However, it is necessary to separate social factors from those of a strictly economic character for appraisal of probable effects on agriculture and the country as a whole.

Many of the recommended changes in the tenure system, especially those designed to promote ownership, might prove costly in terms of productive efficiency. Capital allocation and labor productivity may also be adversely affected by the change in organization of farms along the lines suggested in many policy recommendations. Census figures for the North show that in 1945 land operated by tenants was higher in average value per acre and per farm than that operated by full owners. In terms of acreage, tenants also had the biggest units; their farms averaged 200 acres compared with 116 acres for full owners.

Several writers have commented on this contrast in size of farm between owners and tenants. Dr. Schultz writes: "There is ample evidence that ownership is bought at the expense of the returns to the farmer and his family. When a farmer buys, he is generally forced to take a farm which is too small to permit as high a rate of output relative to his labor and management inputs as would be the case if he rented."²⁰

In becoming owners, farmers with limited capital often invest in small

farms as measured by both acreage and productivity. Ownership under these conditions may result in a substantial reduction in physical efficiency and labor productivity as compared with application of the same amount of capital invested in operating equipment and productive livestock on a rented farm of adequate size.

Encumbered ownership has many disadvantages with respect to security of tenure and freedom of organization for optimum conservation of resources. The encumbered owner may have no more security than many tenants and the necessity for meeting high fixed mortgage and interest payments may compel him to farm in such a way as to obtain maximum income in the short run, regardless of the effects on the future productivity of the farm. In contrast, a tenant with a satisfactory lease often is in a better economic position.

"Tenancy as a permanent status enables the operator to invest his savings in operating capital and improvements rather than in land, if his tenure is reasonably secure and his equity in the farm improvements is protected. This gives him an advantage over the encumbered owner-operator, providing that his rent amounts to less than do mortgage interest, amortization and taxes paid by the owner."²¹

Homestead tax exemption as a tenure improvement measure is another example of a questionable recommendation found in many tenure reports. Present tax rates on farms in some areas are probably relatively high when compared with those on other forms of wealth. Real property frequently bears the brunt of taxation, while other forms of wealth not so easily assessed evade their full share of the burden. Also, farms are taxed on

²⁰ Rainer Schickele, "Tenure Problems and Research Needs in the Middle West," *Journal of Farm Economics*, Feb. 1937, p. 123.

²¹ Schultz, *op. cit.*, p. 315.

gross values while many other types of assets are taxed on net values.

Undoubtedly, the property tax system needs improvement but it is debatable whether homestead exemption is the best device for this purpose. Few tenure recommendation reports recognize the possible consequences of homestead tax exemption on other segments of agriculture. The shifting of incidence of the tax burden and the possible curtailment of essential public services are usually not recognized. It must be borne in mind that homestead tax exemption may fail to achieve the desired results when the alternative methods of providing replacement revenues are regressive. For low income farmers, shifting from a property tax to a gross sales tax may lead to an increase in their tax bill. Often the school system suffers when no alternative revenue measures are provided. In a recent analysis of the effects of homestead tax exemption, Barlowe concludes:

"Outside of holding out a slightly greater incentive for ownership, the homestead exemption program offers little but discouragement for tenants, croppers, and laborers. The tenant, for example, stands to lose because: (1) the possibilities for capitalizing tax savings into higher land values can make harder his problem of accumulating the initial outlay of capital he needs for starting as an owner, (2) the exemption program discourages owners from renting out their land and encourages them to use wage hands and croppers rather than tenants, and (3) the use of replacement taxes such as the general sales tax actually shifts part of the tax burden originally carried by the owners onto the tenant and thus deprives him of part of his possible margin of savings and investment capital."²²

These examples suggest a need for economic analyses of tenure recommendations. Careful consideration of probable

results of such actions must be given to guide policy makers.

"If . . . we are faced with the problem of suggesting ways and means of improving our tenancy system the least that is required is a description of the various ways and means by which certain ends can be attained and a prediction of the results that may reasonably be expected if each, all, or different combinations of such ways and means are selected as programs of action."²³

V

Promotion of Tenure Reforms. This category of tenure literature is related to that described in section IV above, but is distinguished from it by the broader and obviously biased approach. Details connected with the application of such reforms are usually omitted. Writers in this field have frequently "embraced" causes. They are unconcerned with factual data that might cast doubt upon the "goodness" that is certain to accrue from their proposed reforms. Evils are condemned and "stewardship in the land" is extolled. Things "ought to be" a certain way because they are "right," is often the keynote of such articles. Since these utterances are based largely on emotion, they are clearly outside the realm of tenure research. As such, they would hardly be worthy of mention were it not for the fact that such appeals do apparently influence policy.²⁴

In formulating and describing tenure problems it is necessary that research workers strive to maintain an unbiased attitude. Problems should be viewed in perspective and be appraised in relationship to the general agricultural situation. Research workers should avoid becoming "ardent advocates" for any particular policy but should attempt to appraise promising alternatives. If they expect to

²² Raleigh Barlowe, "Homestead Tax Exemption: A Tenure Improvement Measure?", *The Journal of Land & Public Utility Economics*, Nov. 1947, p. 370.

²³ Maddox, *op. cit.*, p. 109.

²⁴ Public reporting and even program promotion is a necessary function of public administration. But this is a task for the administrator or the information specialist, not the research worker.

have their research accepted as accurate, tenure workers must remain aloof from the promotion of "causes."²⁵

The tenure research field has been so encrusted with standard "solutions" and stereotyped attitudes that any heretic who dares to challenge the established dogma runs the risk of being labeled a "reactionary." Consequently, many research workers are reluctant to undertake projects that are likely to upset preconceived notions built up by the emotional appeals of reformers. One writer sums up the results of promotional literature as follows:

"... prejudice, misconception, and often propaganda with malicious intent have clouded the problems of farm tenancy with a dense pall of confusion, and . . . this mental rubbish must be cleared away before anyone will be able to peer into them beyond the most superficial depths of their outer surfaces."²⁶

The foregoing classification of tenure literature is summarized in the accompanying chart.

Looking to the Future

Although it is not this writer's intention to pass judgment on the desirability of further work in any of the five categories enumerated in the chart, a few suggestions may be in order. It appears that for the immediate future, at least, agricultural economists could make their most significant contribution to tenure research by concentrating on economic analyses of major problems in tenure relationships (III). Of course, a continuation of situation and trend studies (II) is needed, and if certain modifications are made the data could really describe the situation so as to shed light on problems requiring intensive study. Research

economists might also make a contribution to policy recommendations (IV), if they will couch them in terms of factually supported alternatives rather than reiteration of stereotyped "cures" for real or alleged tenure maladjustments. Tenure ideology (I), unless backed up by an objective appraisal of probable consequences to be expected from specific goals or ideals, probably might well be left to the philosophers. Promotion of "standardized" reforms (V), although such actions may speed up social change, appear to be outside the field of participation for research economists.

If we accept the premise that tenure research should be emphasized in categories II and III, what then are some of the fields that offer opportunity for productive study? What research approach should be taken to uncover significant facts relative to a better understanding of the processes by which our tenure system functions?

As a first step in looking ahead in tenure research, broad tenure problems should be defined and their implications on agriculture explored. Research agencies and others interested in the solution of tenure problems should emphasize a long-time program of research based on a careful analysis of the fundamental needs in the field. Specific studies of various segments of the tenure system should be integrated so that the ultimate outcome is a comprehensive analysis of the workings of the system. A short-sighted opportunistic policy may result in "band wagon" movements (projects chosen largely in response to suggestions from pressure groups or as a result of follow-the-leader tactics without regard to basic needs). This may lead to a constantly shifting, uncertain research program placing stress on projects that yield quick,

²⁵ Although a large part of the promotional tenure literature is published by church committees or private foundations, many of the policy recommendations and other materials for these reports are prepared by publicly supported research economists.

²⁶ Otis Durant Duncan, "A Sociological Approach to Farm Tenancy Research," *Rural Sociology*, Sept. 1940, p. 291.

partial answers with a consequent neglect of fundamental research.

Tenure research must be dynamic and forward-looking in order to provide in-

formation that will be currently useful in making policy decisions. What is needed is an analysis and projection of past and current data that will present realistically

CLASSIFICATION OF FARM TENURE LITERATURE

I Tenure Ideology	II Situation and Trends	III Economic Analysis	IV Policy Recommendations	V Promotion of Reforms
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SOME DISTINGUISHING CHARACTERISTICS

Description of historical developments	Statistical counts of mass data	Problem approach	Legislation	Changes in tenure system
Concepts of equality and freedom	Graphic Summaries	Critical examination of concepts	Changes in contractual relationships	Deals only with broad concepts and ideals—few details
The "family farm"	Census tabulations	Appraisal of basic influences and effects	Changes in personal and institutional relationships	Condemnation of "evils"
Tenure goals	Tenure area delinations	Analysis of alternatives in terms of efficiency and labor productivity	Tenure improvement programs	Stewardship in the land
	Trends			Things "ought to be" because they are "right"
	Case studies	Examination and appraisal of various means for attaining given ends	Value judgments often not supported by facts	
	Legal aspects			
	Social status			
Largely subjective	Factual and objective Problem defining	Analytical and objective Resolving of problems	Largely subjective	Largely based on emotion
	Some analysis and appraisal but largely descriptive	Problem solving		

the possible results of alternative courses of action under real or assumed conditions.

The problem approach to the study of tenure relations seems to hold the greatest promise.²⁷ Basic to this approach is formulation of the problem by examination of certain elements that appear to be important. Particular emphasis should be placed on carefully stating and defining the problem or problems to be studied. Advance thinking and planning is necessary on this phase of the project in order to "block out" and isolate the segments of tenure to be studied. The problem should be carefully described in order to limit the scope of the study so as to avoid attempting to cover too much of the field in a single analysis. Once it is defined in meaningful and specific terms, the next step is to formulate a hypothesis out of the suggestions and ideas used in stating the problem.

"The formulations of the problem and the hypothesis, always tentative are subject to expansion, revision, modification, and refinement until the hypothesis proposes means which, when instituted, do result in the stated consequences."²⁸

After the problem and working hypotheses are clearly stated, the research worker is ready to determine the kinds of data needed to test the hypotheses and ultimately to provide solutions to the problem. When a problem is defined in all its ramifications, analytical procedures can be applied to ascertain interrelationships. From these detailed analyses it should be possible to discover basic or fundamental principles that would have

general application to a wide variety of conditions.

In the treatment of mass statistics, the research worker should strive to analyze the data in such a way as to bring out their meaning to specific, differently-situated people. We need to go beyond census statistics to describe tenure groups. The tenant of the Corn Belt is far different in many respects from the tenant of the Cotton Belt, yet customary procedure lumps them all together as a "statistic." The human element is largely ignored in favor of the punch card or schedule. It is questionable how well this type of treatment really describes situations and trends. Inventory-type projects should be supplemented by use of the case method (in pure or modified form) in carefully selected spot-studies to retain the pattern of characteristics within the units of observation.²⁹

The importance of tenure problems is great and opportunities for objective research, especially under the sponsorship of cooperative regional tenure research organizations, seem bright if discretion is exercised in selection of projects. Farmers, professional agriculturalists, and others interested in agricultural problems must be shown by cooperative action among the several agencies participating in tenure research that such studies can lead to the presentation of objective information and interpretation that will be a real aid in choosing alternative courses of action. There is a broad and significant field for studies that can lead to this sort of interpretation.

Inclusion of an exhaustive outline of needed tenure research is beyond the

²⁷ Although research workers have long recognized the importance of the problem approach in social science studies, too little attention has been given to this method in formulating tenure projects. The Social Science Research Council says "... All students of scientific methodology recognize that some sort of an hypothesis is necessary as a basis for all purposeful research. The essence of the scientific method lies in the accuracy and objectivity of the measures and analysis, and not in prowling around in the darkness feeling for mysterious objects." (*Research Method and Procedure in Agricultural Economics*, Vol. I, mimeo., Aug. 1928, p. 28.)

²⁸ Salter, *op. cit.*, p. 57.

²⁹ Salter, *ibid.*, p. 45, has this to say about the case method "... (it) has the characteristics ... of also revealing the 'organic unity' of the observed phenomenon, thus giving a true record of what 'occurs' in contrast to the statistical method which is only an abstract approximation." See also L. A. Salter, Jr., "Cross-Sectional and Case Grouping Procedures in Research Analysis," *Journal of Farm Economics*, Nov. 1942, p. 792.

scope of this paper.³⁰ However, a few general areas of tenure research that appear promising are indicated below:

1. *Effects of leasing practices and ownership equities on conservation of farms.* Problems arising in connection with ill-adapted leasing arrangements and high fixed costs borne by owners with low equities have become of increasing importance to the operation of conservation districts and to the carrying out of individual farm conservation plans. Projects in this field might consist of two parts, (a) an appraisal of the problems connected with conservation on rented farms (and possibly mortgaged farms also), and (b) an analysis of possible alternatives for alleviating impediments to conservation. In this latter phase, consideration might be given to collection and analysis of facts that would be useful in the development of a "conservation supplement" to farm leases. Such a supplementary agreement could provide for a definite schedule of payments for unexhausted improvements on rented farms in cases where the tenant moves before the improvement is entirely used. As a separate phase of this project, it would be desirable if the agronomy and soils people would cooperate by developing depreciation schedules for specific conservation practices. This whole study might be set in the framework of increasing efficiency in production and conservation on rented and mortgaged farms.

2. *Leasing adjustments needed as a result of farming shifts due to technological developments and adoption or increases in mechanization and livestock production.* There is reason to suspect that current leasing practices in many areas (particularly in the Cotton

Belt) retard and in some instances prevent the introduction or expansion of mechanization, other technological improvements, livestock farming and specialty crop enterprises on rented farms. The increased proportion of production expenses that must be paid in cash under mechanized farming and the commercialized nature of production makes necessary an appraisal of old bases for sharing expenses and returns. Often customary leasing practices pertaining to management, length of term, renewal, conservation and compensation are tied to conditions of the past and may not fit current needs. Some farm landlords and tenants have made desirable adjustments in their leasing arrangements, and their experiences should be helpful in outlining practical suggestions that others in similar situations might follow. This is an area of study where current research information would be useful to farmers and administrators of public agricultural programs in working toward desirable long-time adjustments in farming.

The various changes in contributions (inputs) and returns (outputs) resulting from new organizations of farms should be studied. Particular attention might be given to tenant farms where changes have been made in farming methods, with the idea of analyzing the different ways in which changes in contributions and returns were recognized. These types of problems are of immediate importance and are of a practical business nature. Farm management data could be used to good advantage, but the main emphasis would be on the rental problems arising in connection with changes in farm organization.

3. *A study of capital requirements in farming.* Under present economic conditions the amount of capital needed to farm and the ways by which it can be acquired are very important, especially to men who

³⁰ Some recent suggestions for needed research in land tenure are included in: John F. Timmons, "Farm Ownership in the United States: An Appraisal of the Present Situation and Emerging Problems," *Journal of Farm Economics*, Feb. 1948; and G. H. Aull, "Research Needs in Land Tenure and Farm Finance," *The Journal of Land & Public Utility Economics*, Aug. 1947.

want to begin farming. The adjustments toward more mechanization and other technical improvements will require utilization of a greater quantity of capital. One phase of this study might deal with agricultural credit (both long and short time) and the source and availability of the several types of loan funds available to the different tenure groups. Availability of credit influences the organization and operation of tenant and mortgaged farms. How do diverse tenure arrangements affect the sources, costs, and supply of credit? We need to know more about these influences and how productivity of capital invested in farming is affected by tenure arrangements and mortgage terms.

Another part of this project would be the study and analysis of alternative ways of acquiring farming capital, including self-financing by the farm operator. The implications of differing methods of financing on production, employment and efficiency would need to be explored. This would involve an analysis of the several ways by which farmers obtain funds to invest in their farms and the way these funds are used. The influences of general economic conditions on farmers' ability to accumulate capital should also be appraised. It would be desirable to study step-by-step capital accumulation by farmers, and the importance of inheritance and gifts as sources of funds.

4. *Problems of marketing faced by different tenure groups.* Marketing problems of owners (both as producers and consumers) may be very different from those of tenants and croppers. What outlets are available to the different groups? Who makes the decisions on rented farms as to where, when and how to market the products of the joint enterprise? The whole complex of marketing problems arising out of the contractual relations of landlord and tenant should be better

understood in order that marketing and distribution of farm products can be improved in many areas. Changes in tenure arrangements because of mechanization and increased emphasis on livestock production, especially in the South, may give rise to many marketing problems. This is particularly true if new products are grown or if a change in quality results from the adoption of new techniques such as improved varieties of crops, mechanical cotton pickers, and combines.

5. *Analytical studies of government tenure improvement programs.* A critical examination of the Tenant Purchase Program and other tenure improvement schemes is necessary to guide legislators and other policy makers in planning future programs. Assuming that such programs are successful during periods of rising prices, what modifications would be necessary under a stable or declining price level? Strengths and weaknesses of the various programs should be described and appraised so that progressive and intelligent changes can be made. The economic consequences of these programs should be analyzed in order to bring out direct and indirect influences on different tenure groups. Policy makers and administrators of public programs should be able to call on unbiased research findings for alternatives to, and modifications of, existing programs. Public hearings alone may not provide a satisfactory background for establishing tenure policy. Probably studies of government tenure improvement programs could best be conducted by independent research agencies and colleges that do not rely upon Federal financing.³¹

6. *Studies of problems incident to farm ownership.* Such measures as mortgage

³¹ Cf., Charles M. Hardin, "Programmatic Research and Agricultural Policy," *Journal of Farm Economics*, May 1947, pp. 359-382.

moratoria and debt adjustment might be studied in light of past experience to evaluate the feasibility of again using such devices, if farmers face circumstances similar to those of the early 1930's. Farmers could use more and better information about mortgage and purchase contract terms. What are the desirable features that they should insist upon and what are the undesirable ones for which they should be on the lookout? In the first steps this type of study would be primarily descriptive; analysis should be reserved for later consideration and should be aimed at developing a set of general principles that could guide both investors and borrowers. Foreclosure procedures and practices with regard to deficiency judgments need appraisal.

We ought to know more about the relationship of land prices to farm income and costs; their relation to labor and management returns and to gross and net rents. Property taxes are an important fixed cost to farm owners, consequently more complete information is needed to suggest possible adjustment in the tax system or in the administration of tax laws. An appraisal of assessments and levies by size of farm, value and productivity would be a first step in providing suggestions for improvements.

Since part of this type of research overlaps the agricultural finance field, perhaps such projects as are undertaken should be of a cooperative nature.

The processes by which farmers acquire ownership of farms provide an excellent field for tenure study. What are the relative economic efficiencies of ownership vs. tenancy? What are the advantages and disadvantages? How do farmers acquire capital to enter farming? How long does it take under varying economic conditions? How important are inheritance, nonfarm employment, and credit in the acquisition of ownership? Answers to these and similar questions should be useful to farmers, provided they result in description and analysis that will furnish alternative solutions to emerging problems.

Basic research in the fundamentals of tenure must go hand in hand with educational and legislative programs. For these programs must be grounded on an analysis of basic facts if they are to contribute to a sound solution of tenure problems. The task of the research worker in tenure will not be easy, but the field offers a real challenge and the possibilities are unlimited for capable personnel to make a significant contribution to the welfare of our farmers.

The Housing Needs of the Nonwhite Population in Nonfarm Areas†

By DOUGLAS ROSENBAUM*

ALTHOUGH it is commonly known that Negroes and other racial minority groups are ill-housed, the extent of their housing requirements has never been determined quantitatively on a national basis. Estimates have been made for the Nation as a whole by various housing analysts, but there has been no determination of the specific requirements of the largest racial minority segment of the population, the nonwhite.

For Negroes, who constitute about 95 percent of the nonwhite population, and for the other racial minorities, housing difficulties are complicated by a pattern of discrimination on the grounds of race or color. Consequently, they face housing problems which differ from those ordinarily encountered by others in the same income and rent classes. Since the purpose of this article, however, is to express their dwelling needs in terms of physical dwelling units, certain assumptions have been made. For example, a cardinal principle followed in developing the estimate presented herein is that the standards posited for adequate housing be applied uniformly for all groups in the population regardless of race or color, or their financial ability to obtain adequate housing.

Two fundamental concepts are involved in the determination of housing requirements, whether of the total or of the nonwhite population: one, needs and two, effective or market demand. Ac-

monious discussion has resulted from failure to realize the differences in meaning of the terms "needs" and "demand" as related to housing. To avoid confusion in interpreting the figures presented, terms are defined.

The dominant factors determining needs are (1) conformance of the inventory to the standards set in terms of the physical characteristics of dwelling units and the environment or neighborhood in which they are located, and (2) sufficiency of the housing supply to provide independent living quarters and an adequate choice thereof to permit mobility to all families who want dwelling units. These standards are established without any modifications because of color of the occupants or their position in the income scale. Through its Committee on the Hygiene of Housing, the American Public Health Association has set forth criteria by which dwelling units are judged to be below the desirable minimum essential to the well-being of their occupants. These criteria¹ are:

I. Condition Constituting a Basic Deficiency in Dwelling Unit

A. Facilities

Source of water supply specifically disapproved by local health department.

Means of sewage disposal specifically disapproved by local health department.

Toilet shared with other dwelling unit, outside structure or of disapproved type (flush hopper or non-standard privy).

Installed bath lacking, shared with other dwelling unit or outside structure.

Water supply outside dwelling unit.

† Thanks are due Eleanor H. Wolkind of the Housing and Home Finance Agency for her very valuable review of this study. Helen C. Monchow and Frank S. Horne, both of the same Agency, read the manuscript and made helpful suggestions. The responsibility, however, for any estimates or statements is entirely the author's.

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¹ See American Public Health Association, Committee on the Hygiene of Housing, *An Appraisal Method for Measuring the Quality of Housing* (New York: 1945, Part I), pp. 65, 67.

- Dual egress from unit lacking.
- No electric lighting installed in unit.
- Three-fourths or more of rooms in unit, lacking installed heater. Outside window lacking in any room of unit.
- B. Maintenance
 - Deterioration of units beyond degree set by American Public Health Association.
- C. Occupancy
 - Room crowding: over 1.5 persons per room.
 - Area crowding: Less than 40 square feet of sleeping area per person.

II. Condition Constituting a Basic Deficiency in Environment

- A. Land crowding.
- B. Nonresidential land uses.
- C. Hazards and nuisances from transportation system.
- D. Hazards and nuisances from natural causes.
- E. Inadequate utilities and sanitation.
- F. Inadequate basic community facilities.

There has been some controversy over the means by which the conformance of the housing supply to the established standards can be measured. The Census of Housing conducted in 1940 and several sample housing surveys conducted subsequently provide the only bases for national estimates of the number of substandard units. The data available from the Bureau of the Census do not yield information on the adequacy of light, air, open recreation space, or the neighborhood. However, the American Public Health Association has found that there is a correlation in urban areas between such factors and the lack of plumbing facilities.²

² See A. A. Twichell, "A New Method for Measuring the Quality of Urban Housing," *American Journal of Public Health* (New York: American Public Health Association, June 1943), pp. 729-739.

³ For detailed analysis of the changes in the quantity and quality of housing occupied by nonwhites, see Housing and Home Finance Agency, *Housing of the Nonwhite Population, 1940 to 1947* (Washington, D. C.: Government Printing Office, 1948).

⁴ Various analysts have used different assumptions to determine the magnitude of substandard units to be replaced or rehabilitated. Although there is general agreement that units needing major repairs can be classified as substandard, there are variations in the treatment of the proportion of non-

There is some question as to how closely the lack of plumbing facilities corresponds to the basic deficiencies of dwelling units at present. It may be that while in the past there was a close association between lack of plumbing facilities, for example, and housing which was inadequate in other respects as well, this may no longer be the case. As a result of wartime restrictions on new construction, some housing which may have been modernized through the addition of baths and toilets nevertheless remained deficient as far as layout or access to light and air are concerned.³ What is not revealed by the sample survey of housing and population conducted in April 1947 by the Census Bureau is how basic was the improvement, measured superficially by reference to the need for major repairs or the existence of plumbing facilities.

However, if it may be assumed that the relationship is still significant and since data relating to plumbing facilities have been tabulated by the Census Bureau it is possible to obtain an approximation of that portion of the housing inventory which may be classified as substandard not only because facilities essential to modern sanitation are lacking, but also because they are deficient in other respects which cannot be measured precisely. There is, in addition, a group of housing units which most analysts of housing needs have accepted as substandard—those in need of major repairs.⁴

farm units in good condition but lacking private bath and toilet. For example, in *Housing Needs* (National Housing Agency, Washington, D. C.: Government Printing Office, November, 1944) all units not in need of major repairs but without private bath and flush toilet are considered substandard if they are within metropolitan districts. P. M. Hauser and A. J. Jaffe, in their article, "The Extent of the Housing Shortage" (*Law and Contemporary Problems*, Durham: Duke University Press, Winter Issue, 1947) assume that only urban units lacking private bath and flush toilet should be included in an estimate of substandard units. Finally, Dr. J. Frederic Dewhurst, economist for the Twentieth Century Fund, has taken the view that all nonfarm dwelling units not containing the essential plumbing facilities are substandard. See Hearings before the Special Committee to Study and

(Footnote 4 continued on page 333)

The family needs postulated are also based on the findings and projections of the Bureau of the Census. The most important question arising in this segment of the estimate has been that of undoubling of married couples living with other families. The extent to which doubling is voluntary and independent of the housing shortage or of the absence of dwelling units at prices or rentals commensurate with incomes indicates the level of family needs. Despite this and other problems attendant upon the estimating and forecasting of families, the data released by the Bureau of the Census offer a substantial basis for setting the volume of housing needs arising from family formation.

Since housing shortages are so intimately related to family incomes, the feasibility of meeting total social needs therefore becomes a matter of public rather than individual concern. The desirability of accomplishing a program designed to fulfill all the social requirements for housing over a chosen period of years is determined by weighing the urgency and magnitudes of many types of capital outlays other than housing. The relation of the total volume of gross private domestic investment to the gross national product must be considered also. There is room for considerable latitude in the proportion of outlays which might reasonably be devoted to housing as the fluctuations in percentage relationships in the past have indicated. It may be demonstrated also, however, that even though the capacity of the construction industry may be stepped up in a few years' time to produce not only the houses but also the ancillary facilities required, such as roads, streets, sewer and water lines, schools, etc., such expansion

might reflect an unwise policy in terms of its effects on the stability of the economy.

As was demonstrated above, need is determined on the basis of the physical requirements of families for dwelling units, and the conformance of the housing supply to certain standards of quality and condition. Market demand, on the other hand, is concerned primarily with people's desire for housing coupled with ability to pay prevailing prices or rents. It is not necessarily the translation of need into effective demand as a result of the existence of purchasing power. Effective demand may and frequently does arise because some families which are well-housed according to the need criteria want something better.

Although the term "requirements" may refer to either the need or the probable market demand or both, such reference should be clearly specified. In this study the housing requirements of the nonwhite population in nonfarm areas are developed in terms of the need for housing.

Derivation of Needs Estimate

Estimates of the housing requirements of nonwhites are more meaningful if developed in relation to estimates of total housing requirements. Since the most authoritative estimate at this time is that presented by the Joint Congressional Committee on Housing in its *Final Majority Report*, March 15, 1948, it would appear most advantageous to gear the estimate for nonwhites to the Committee's estimate. The period chosen for its estimate is 1948 to 1960. Gross requirements were estimated from 1947 to 1960 since most of the bench-mark data were available as of April 1947. The estimated number of units added to the supply in the ensuing year was then deducted in order to obtain an estimate for the 12 years beginning in 1948. Al-

(Footnote 4 continued from page 332)

Survey Problems of Small Business Enterprises, Senate, 79th Congress, First Session, May 1945, pp. 7649, 7656 (Problems of American Small Business Series, Pt. 64).

though the Committee went on to estimate the minimum and optimum construction needed by varying its assumptions as to the rate of replacement, the estimate of the housing needs of nonwhites is based on the minimum assumption, as indicated in the section below. To orient the subsequent discussion, a summary comparison of the Committee's estimate of total housing requirements and that developed by the writer is presented in Table I. Percentage relationships between the figures for total and for nonwhites are shown in order to indicate the variances among the components.

Determination of New Needs. The Committee's tabulation showing additional nonfarm housing needed by 1960 was based on a forecast of 39,500,000 nonfarm households in 1960. It is estimated that 3,475,000 of these households will be nonwhite. This represents 8.8 percent of all nonfarm households, which was the proportion found in 1947. Although in the decades prior to 1940 the proportion of nonwhite households to all households declined, this trend was reversed between 1940 and 1947. Since under favorable economic conditions it is likely that the proportion may remain

TABLE I—ADDITIONAL NONFARM DWELLING UNITS NEEDED BY 1960
(In thousands)

ITEM	Total (Committee's Estimate)	Nonwhite (Author's Estimate)	Nonwhite as Percent of Total
Estimated 1960 families.....	39,500	3,475	8.8
Allowance for 4 percent effective vacancies (i. e., units actually for rent or sale, and habitable year round).....	1,600	145	9.1
Total dwellings needed in 1960.....	41,100	3,620	8.8
Subtract: Effective Inventory.....	32,729	2,863	8.7
Number of additional units needed from be- ginning of 1947.....	8,371	757	9.0
Subtract: Units added in 1947.....	1,000	75	1.5
Net additional number needed between 1948 and 1960 to bring requirements and sup- ply into balance.....	7,371	742	10.1
Add:			
For replacement of estimated losses from 1947 to 1960 (fire, demolition, floods, etc.).....	520	45	8.7
For replacement of nonfarm units in need of major repairs and of urban units lacking private bath and toilet.....	5,200	1,360	26.2
For replacement of substandard units in sur- rounding suburban areas and for replace- ment of standard units deteriorating by 1960.....	2,000	150	7.5
For replacement of temporary structures.....	350	40	11.4
Total replacement, 1948-60.....	8,070	1,595	19.8
Minimum construction needed.....	15,441	2,337	15.1

constant or even increase, it appears that the long-term downward trend observed before 1940 may no longer hold. Therefore the 1947 proportion of nonwhite households was applied to the projected number of all nonfarm households in order to determine the magnitude of the nonwhite segment. Since there were 2,843,000 nonwhite households in nonfarm areas in 1947, the 3,475,000 nonwhite households in those areas projected to 1960 involve an estimated increase of about 630,000.

The Joint Committee on Housing used a vacancy ratio of 4 percent of the effective supply as a desirable standard. The effective supply, as defined by the Committee, consists of occupied units plus vacant units which are habitable, non-seasonal, and available for sale or rent. Deducted from the inventory are uninhabitable units, vacant seasonal units, resort units occupied at the time of enumeration by people whose residences were elsewhere, units held off the market for various reasons, and those rented or sold but not yet occupied. In order to provide a four percent effective vacancy ratio for nonwhite families in 1960, approximately 145,000 vacant units will be required as part of the nonfarm housing supply open to nonwhites. It should be understood that this item for vacant units represents a "float." Obviously, it is not proposed to keep a given group of units vacant constantly. Since it was estimated that approximately 20,000 of the usable vacant units were available to nonwhite occupants in 1947, it appears that about 125,000 additional units should be constructed in order to provide an adequate vacancy margin by 1960.

Thus, combining the estimated net increase in households and the allowance for vacancies, it appears that by 1960 the total number of nonfarm dwelling units occupied by or available to nonwhites should be increased by about 755,000.

A deduction, however, must be made for the units added to the supply in 1947. For the total population this offset was substantial, since the supply of nonfarm dwelling units is estimated to have increased by approximately 1,000,000 units in 1947. However, all the evidence available points to the fact that nonwhites have not shared pro rata in the absorption of this increase in the supply. From a number of surveys conducted by the Bureau of Labor Statistics in selected localities it appears that the weighted average percentage of nonfarm family dwelling units started for nonwhites in these areas was .7 percent.⁵ Although this evidence is not conclusive, it does point to the probability that the nonwhites' share of new dwelling units was far less than their proportion in either the population or the number of households. Since the figure of 1,000,000 dwelling units includes some volume of conversions, perhaps 100,000 units, in which nonwhites may have shared in direct proportion to their relation to the total number of nonfarm households, it is believed that 15,000 units would constitute a reasonable approximation of the number of units added to the nonfarm housing supply available to nonwhite occupancy during the past year. The additional number of units needed for nonwhite occupancy between 1948 and 1960 is about 740,000 net.

Determination of Replacement or Rehabilitation Needs. The criteria for determination of substandard units selected by the Joint Committee on Housing were (1) need for major repairs for all nonfarm units and (2) lack of a private bath and toilet for urban units even though they may not need major repairs. Of the

⁵ See brief filed by the American Federation of Labor as Amicus Curiae in *J. D. Shelley, et al. v. Louis Kramer, et al.*, in the Supreme Court of the United States, October Term, 1947, No. 72, 87, 290, 291, pp. 29-30. Some of the evidence presented in this brief is based on unpublished data collected by the Bureau of Labor Statistics.

total of 5,200,000 units estimated by the Committee to be substandard, it appears that 1,360,000 were occupied by nonwhites. As of 1947, 710,000 nonfarm dwelling units occupied by nonwhites were in need of major repairs and another 650,000 units did not need major repairs, but since they were located in urban areas and lacked private baths and flush toilets, were considered substandard.

In addition, the Committee made provision for a combined estimate of 2,000,000 to allow for units (occupied by both whites and nonwhites) in surrounding suburban areas and for units falling into disrepair by 1960. In order to derive an estimate of the nonwhite segment of this combined group, it appears necessary to treat the two components of the Committee's estimates separately. It is stated in the Committee's report that the replacement of standard units deteriorating by 1960 involves about one-half of one percent of the inventory of standard housing each year. As was shown above, it was estimated that as of 1947 there were 1,360,000 substandard units occupied by nonwhites. Since the total number of nonfarm dwelling units in which nonwhites were living amounted to 2,843,000, the residual number of standard units occupied by nonwhites is estimated at 1,480,000. Application of a deterioration rate of one-half of one percent a year for 13 years results in an estimate of about 95,000 units which, although not substandard now, may become substandard by 1960.

If the Committee's term "surrounding suburban areas" is interpreted to mean the rural-nonfarm sector of metropolitan districts, since all deficient urban units and all nonfarm units in need of major repairs have already been included above, it would appear that another 55,000 units also are substandard now. Rural nonfarm units in metropolitan districts

could be considered deficient if they lacked private bath and flush toilet even though they may not need major repairs. It is estimated that there were approximately 55,000 such units on the basis of 1940 data adjusted for the improvement which it is believed must have occurred since then in this sector of the supply.

Thus, the figure derived herein as the nonwhite component of the 2,000,000 units mentioned above is 150,000. This is made up of 55,000 substandard units in "surrounding suburban areas" and 95,000 units which it is believed likely will deteriorate by 1960.

Estimated losses of units because of fire, storm and flood are extremely difficult to compute. A token estimate of 45,000 for the entire period is presented. This is based on the total losses estimated in the report of the Joint Committee on Housing. The nonwhite segment was derived by application of the nonwhite percentage (8.8 percent) of all nonfarm households in 1947 to the total estimated losses.

The remaining factor for which the Joint Committee on Housing provided was the replacement of temporary war and veterans' re-use housing. On the basis of the percentages of nonwhite occupancy of such projects revealed by Federal Public Housing Authority reports⁶ it is estimated that 40,000 of the total 350,000 dwelling units shown in the Committee's report are occupied by nonwhite households.

The summation of all the items calling for replacement or rehabilitation results in a total of 1,595,000 nonfarm dwelling units by 1960. This figure, combined with the estimated net volume of new needs (increase in number of households

⁶ Estimate based on following Federal Public Housing Authority Reports: S-113, *Summary Report, Veterans' Re-use Program*, April 9, 1947, (ditto); S-131, *Progress Report as of March 31, 1947* (Multilith); S-602; *Federal Public Housing Authority Housing Available to Negroes*, May 6, 1947 (ditto); S-507, *Tenants and Adjusted Rents in Veterans' Re-use Housing*, May 22, 1947 (multilith).

plus vacancy requirements) of about 740,000 produces a grand total of 2,335,000 nonfarm dwelling units, which it is estimated will be needed by nonwhites if their housing requirements are to be met to the same extent proposed for the population as a whole by the Joint Committee on Housing. To meet this need in 12 years it would be necessary to build 195,000 dwelling units annually.

Validity of Estimate. The estimated need of 195,000 units annually for twelve years which was developed in the preceding section is an approximation designed to help us to get our bearings in a hitherto unexplored area. It is not believed that 195,000 units annually can be justified as the exact number of dwellings required by nonwhites in the next twelve years. Rather the figure itself is the result of a set of assumptions and mathematical computations which served simply as tools to produce a magnitude and not a precise number. Consequently, in the ensuing discussion a round figure of 200,000 will be used since we do not claim that degree of accuracy which is implicit in 195,000 units. While it is recognized that other approaches to the problem of estimating long-term needs may yield different estimates which also appear reasonable, it is believed nevertheless that the estimate of 200,000 dwelling units a year would not differ widely from other estimates developed on the basis of alternative criteria and assumptions.

For example, if it is decided on the basis of the improvement in the inventory recorded between 1940 and 1947 that provision should not be made for current replacement needs, the estimate would be reduced by 95,000. If it is also believed that the replacement or rehabilitation of units in the surrounding suburban areas (or the rural-nonfarm units in metropolitan districts according to our interpretation) is unnecessary, this item too may be

excluded and 55,000 units dropped from the estimate of housing needs. The net effect of excluding these two items means a difference of about 12,000 units a year. There can be little quarrel with the classification as substandard of units lacking private baths and toilets in urban areas, or of units needing major repairs. Although the data upon which these estimates are based are subject to sampling error, it is probable that in this segment too possible modifications will not have a major effect upon total estimates.

In the matter of needs resulting from the net increase in the number of nonwhite families, there may also be valid differences of opinion. The fundamental estimate in this section is the total number of nonfarm families forecast for 1960. As the Census Bureau itself indicated in its release, *Estimates of Number of Families in the U. S.: 1940 to 1960*,¹ a number of alternatives are possible depending upon various combinations of circumstances. There is a difference of 4,650,000 between the "low" and the "high" families forecast for 1960 by the Census Bureau in the release cited. It can be seen readily that considerable variation may occur, depending upon the particular forecast chosen. However, the estimate of nonwhite housing needs presented herein is related to the forecast of all nonfarm families used by the Joint Committee on Housing, a figure which upon analysis appears consistent with the "medium" forecast of the Census Bureau. Within the framework of the Committee's estimate there is room for variation in the proportion selected for nonwhite households. It may be that the nonwhite households as a proportion of the total will recede to 8.2 percent (the 1940 proportion). On the other hand, the rate of increase observed between 1940 and 1947

¹ U. S. Bureau of the Census, Population—Special Reports, *Estimates of Number of Families in the U. S.: 1940 to 1960*, Series P-46, No. 4, June 1, 1946.

may continue and the nonwhite households as a proportion of all nonfarm households may reach 10 percent. If the first assumption should be realized, the increase in the number of nonwhite families would be about 400,000 instead of the 630,000 shown in the estimate presented herein. This would reduce the estimated annual nonwhite housing needs by 19,000 units. On the other hand, if the higher proportion should prove to be correct, the needs resulting from the increase in families would rise by about 40,000 units annually. These modifications are without reference to the effect on vacancy requirements which, however, would be negligible in the total estimate, or replacement of temporary units, or units destroyed or demolished.

Thus, if all of the "high" factors were combined, approximately 50,000 units would be required annually in addition to the 200,000 units derived in the proposed estimate. If, on the other hand, all the "low" factors were combined, approximately 50,000 fewer units would be required than is shown in the estimate of 200,000. The resultant estimate of 200,000 appears justifiable on the basis of the present state of our knowledge and housing standards.

It must be admitted that the present state of our housing knowledge could stand considerable advancement. Too few data are available to show which neighborhood factors in housing should be considered in determining its adequacy. Studies and surveys should be conducted for the purpose of developing devices to indicate with greater accuracy the volume of substandard housing. While it may not be practicable to measure environmental factors such as access to light, air, and play space, it may be possible on the basis of detailed surveys to develop correlative factors which are susceptible of large-scale statistical meas-

urement. The surveys conducted for this purpose should recognize the importance of distinguishing the nonwhite segment of the population living in the units and neighborhoods studied because of the disproportionate degree to which nonwhites live in deficient housing and neighborhoods. According to the computations shown in the pilot estimate of housing needs presented above, about 1,500,000 units already substandard or expected to become substandard by 1960 were occupied by nonwhites compared to a total of 7,200,000 such units estimated by the Joint Committee on Housing. This is about 20 percent, which is more than double the proportion of nonwhite households to all households in nonfarm areas.

It also would be desirable to investigate further the problems of family formation among nonwhites. One type of estimate in which experimental work should be done is the forecasting of the number of nonwhite households on the basis of age-specific ratios applied to the recent forecasts of the nonwhite population released by the Bureau of the Census.⁸ The household forecasts thus derived should be considered in connection with projections of the number of married couples in order to determine the percentage of doubling consistent with household forecasts. Doubling has been so pronounced among nonwhites that it would be important to determine the levels associated with various projections of the number of households.

Additional analyses should be conducted in order to cast more light on the problem of deterioration of dwellings since nonwhite households tend to be housed in older structures. Since relatively little new construction is undertaken for nonwhites, and as a conse-

⁸ U. S. Bureau of the Census in cooperation with Scripps Foundation for Research in Population Problems, *Forecasts of the Population of the United States, 1945-1975* (Washington D. C.: Government Printing Office, 1947.)

quence they tend to occupy "hand-me-down" housing, the rates at which various types of dwelling units deteriorate with age are of concern in estimating the housing needs of nonwhites.

Conclusions

The estimated need of 200,000 nonfarm units annually for the nonwhite population is great on several counts. First, it is large in comparison with the nonwhite proportion of households, 15 percent of the Joint Committee total compared to the 8.8 percent that nonwhite households are of all nonfarm households. Second, it is large in comparison with the number of units constructed or converted for occupancy by nonwhites in the past. Extremely little is known of the scale of new construction operations to provide units for nonwhite occupancy. However, as was brought out previously, the number of dwelling units added to the supply through new construction and conversions in 1947 (which was a year of great housing pressure and relatively high income for nonwhites) was estimated at only 15,000. It is probably true that some additional units were made available to nonwhite households through the operation of the filtration process. But in a period of housing shortage as intense as that experienced in 1947, it is unlikely that on net balance there was any significant shift of standard existing units from white to nonwhite occupancy.

Although the transfer of occupancy of existing dwelling units has been a traditional means by which nonwhites have obtained housing, this has produced results which are unsatisfactory. Housing occupied by nonwhites is inferior to that of the rest of the population. It can be demonstrated on the basis of an analysis of 1940 census data that nonwhites re-

ceive less for their housing dollar than do whites.⁹ In other words, despite the fact that their incomes may enable them to pay higher rents for decent housing, they are forced to accept housing of inferior quality because of restrictive practices which sharply limit the areas in which they may live. Thus, they do not have even such limited mobility and freedom of choice as is available to the rest of the population currently, and when they do possess the funds to pay for housing they are seriously circumscribed in obtaining it, particularly for the new housing being constructed.

In any comprehensive housing program special attention must be given to the problems of nonwhites. The fact that their incomes generally are on a scale below that of the rest of the population makes it imperative that, in any large scale housing program, there be conscious recognition of the particular aids and incentives required to meet the needs of the nonwhite population. Although in this article no attempt is made to arrive at an approximation of the relative proportion of the total needs which may have to be met by publicly financed housing, examination of income data published by the Bureau of the Census reveals that about 56 percent of the nonwhite families of two or more persons received total money incomes of under \$2,000 in 1946.¹⁰ Thus, it is probable that a substantial volume of the shelter needs of nonwhite families shown under existing conditions can be met only by public housing. For those nonwhite families in income groups above \$2,000 new devices and incentives to private builders must be found. Only through a combination of positive programs in both the private and public sectors of our economy can the housing needs of nonwhites be met in full.

⁹ See Corienne K. Robinson, "Relationship Between Conditions of Dwelling Units and Rentals, By Race," *Journal of Land & Public Utility Economics*, August 1946, pp. 296-302.

¹⁰ U. S. Bureau of the Census, *Consumer Income, Income of Nonfarm Families and Individuals: 1946*, Series P-60, No. 1, January 28, 1948.

The Federal Coordinator's Investigation of Common Carrier Subsidies

By G. O. VIRTUE*

THE policy of granting subsidies and other forms of government assistance to give direction to investment and employment doubtless has its advantages, but it also has its difficulties. Among these is the difficulty of keeping the left hand informed as to the effect of what the right hand is doing under this form of government planning. Our long experience in giving public encouragement to new types of transportation as they have come upon the scene, usually after contentious opposition, serves as an illustration. For example, the assistance given to railroad transportation through relief from taxes, the use of public credit, the right of eminent domain, and grants of land for right-of-way and other purposes, was a factor, although perhaps a minor one, in the early struggle between rail and water carriers which resulted in the practical elimination of artificial waterways, the decay of river transportation, and the growth of an unregulated railroad monopoly which by the 1870's had become a grave national problem. It took a full generation to bring the monopoly under reasonably effective regulation. Meanwhile, new types of transportation had appeared—by pipeline, by motor vehicle, by air—all of them like the early railroads, assisted and unregulated. By the time of the first World War, the conditions were ripe for the reopening of the old subsidy controversy.

Until the publication of Mr. Eastman's report¹ there had never been a comprehensive and authoritative study of the nature and extent of the various forms of

public assistance given to domestic transportation. The extent to which the conclusions of the report are finding their way, sometimes at chapter-length, into the textbooks and more pretentious publications, indicates the welcome with which the investigation has been received. To review the work as a whole would require a combination of statistical, engineering, and economic training to which but few can lay claim. There are certain features of it, however, which may be examined without that rare combination of skills. Among these are the economic conditions which called forth the investigation, the theories and general principles which guided it, the methods employed in evaluating the aid given to different types of carriers, and especially the character and amount of aid charged to the railroads—more particularly that part of it derived from grants of land, the traditional views of which seem to require revision.

I

One of the most persistent complaints of the rail carriers against the new regulatory system provided for in the Act to Regulate Commerce was directed against the restriction placed by the Act upon their power to meet water competition. This restriction was the more keenly felt because of the continued policy of encouraging the free and essentially unregulated use of water facilities built and maintained at public expense with the avowed purpose of creating competition with the railroads. During the years immediately preceding World War I, just when for the first time railroad regulation was becoming reasonably effective,

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¹ The Federal Coordinator of Transportation, *Public Aids to Transportation*. Government Printing Office. Washington, 1940.

the government increased its expenditures for water facilities. The ill-success of the railroads in handling the suddenly increased movement of freight to the Atlantic ports during the war spurred the growing public interest in water transportation. Signs of an intensification of water competition, actual and potential, multiplied. There was again an upward turn of expenditures for water carrier facilities. The Panama Canal, opened in 1914, was by 1917 in regular use by coast-to-coast carriers; and, in order to make it an assured means of competition with the railroads, rail carriers were debarred from its use. In 1918, to demonstrate the feasibility of reviving river commerce, a government-owned, government-operated barge service was established on a few rivers and was later extended to others. What was of perhaps more immediate consequence, some three and a half million deadweight tons of government shipping built during the war, were sold at about 30 per cent of cost, to be employed in the coastwise, intercoastal, and nearby foreign trade.² With this change in conditions, present and prospective, came a change of emphasis in rail-carrier complaints of unfair treatment. They were now directed less against the Interstate Commerce Commission for disallowing defensive rate-changes and more against the government policy of "subsidizing" a body of unregulated, largely untaxed, competing carriers, a large part of whose costs were concealed in public expenditures. Thus a new phase of the subsidy controversy which in an earlier generation had been directed chiefly against the railroads was now opened, the rail carriers themselves being the aggrieved party.

This shift of emphasis was the more pronounced because of the spectacular development, during and after the war,

of new types of "subsidized" competition offered by motor vehicle and air carriers. The automotive industry's growth during the first two decades of the century was to the railroads portentous. Already by 1915 two and a half million passenger cars and more than a hundred thousand trucks and road tractors were operating on the public roads. By 1921 these numbers had risen, respectively, to 10.5 million and one million; and, by 1929, to 26.5 million and 3.3 million. The new type of vehicle required new, improved, all-season roads. The dollar-matching policy of the federal government (1916) and the discovery of the gasoline tax (1919) gave a great impetus to such improvements. The outlays for them rose to astonishing levels. All states, counties, townships and districts were, in 1914, spending \$240 million on rural roads. In 1921 all grades of government spent \$1.036 million and in 1929, \$1718 million. For the 12 years, 1921-1932, the aggregate expenditures were, in round numbers, \$14 billion for rural roads; and in the same period urban street expenditures totaled more than \$8 billion.

The multiplication of transportation facilities was going on in other fields. Pipeline construction took a new start in 1920 and in the next twelve years investment in them increased by half a billion dollars. The Post Office Department, after ten years of pioneering work to create an air-mail service, adopted the policy, in 1925, of making contracts with private companies to carry the mails. Growth of the service was rapid. Not only was an increasing portion of the mails being carried by plane, but by 1933 half a million passengers were carried 173 million passenger-miles, and further inroads on rail transportation were clearly in prospect as the planes demonstrated their ability to carry cargo. The outlay for these various forms of transport was

² *Public Aids to Transportation*, Vol. III, pp. 194-5.

stupendous. Mr. Eastman points out that from 1920 to 1933 "approximately \$25,000,000 were put into transportation facilities, an amount greater by one-fourth than the property investment of the railroads at the beginning of the period."³

A new transportation system had developed almost overnight. Transport facilities had increased far beyond the needs of the country even if industry had continued on the "new plateau" of 1928-29. The on-coming of the depression produced a transportation crisis, especially for the rail carriers. From 1929 to 1932 their traffic fell off by one-half; their net operating income within the same period dropped from one and a quarter billion to 326 million dollars. At a time when borrowing was imperative the usual sources of credit were all but dried up. The situation led to the adoption of emergency measures, among them the Emergency Railroad Transportation Act of 1933. Rail carrier complaints against "subsidized competition" were renewed with vigor. The Interstate Commerce Commission had heard a great deal about the unfairness of the government's subsidy policy but, regarding aid to other carriers as a minor cause of railroad ills, had done nothing about it. In 1931, however, an appropriation was requested for an investigation of the whole subsidy question. The request was rejected. But a way was opened for the inquiry by the passage of the Emergency Act which created the office of Coordinator of Transportation. The office was to expire at the end of one year unless ordered otherwise by the President. Joseph B. Eastman, long a member of the Commission, was appointed to the position. Among the specific duties assigned him

no mention was made of the subsidy question but authority was found for investigating it in a vaguely-worded section (13) and a division of research was at once set up for that purpose. In translating numerous forms of aid into comparable pecuniary terms many difficult statistical, engineering, and economic problems were encountered, and when the office, after having been twice continued by executive order, expired in June, 1936, the study was still unfinished. Means were found, however, for its completion and publication in a series of reports containing the results.⁴

II

The present concern is not with the intricate statistical methods employed in the study, nor with the use made of it by the government, but rather with the purpose of the investigation, the standards employed in measuring aids, the amounts charged against the several types of carriers, and, more particularly, with the amount and character of the aids found to have been given to railroads.

The purpose of the investigation as set forth by Mr. Eastman was to ascertain the "extent to which public aid has been and is given to the various modes of transportation and is a factor in their competition with each other"; whether "it is sound public policy to encourage duplication of facilities and warfare all along the line, or to find the work each form of transportation can do best and endeavor accordingly to set up a national transportation system." It was found that the term "subsidy"—so much publicized by the railroads—was in its strict sense too narrow to include all forms of assistance given transportation. The term "public

³ The Federal Coordinator of Transportation, *Regulation of Transportation Agencies*, Senate Document, No. 152, 73d Congress, 2d Session, pp. 2, 22.

⁴ *Public Aids to Transportation*, Volume I. General Com-

parative Analysis and Public Aids to Scheduled Air Transportation; Volume II. Aids to Railroads and Related Subjects; Volume III. Public Aids to Water Transportation; Volume IV. Public Aids to Motor Vehicle Transportation, Government Printing Office, 1940: Volume I.

aid" was, therefore, chosen and "defined for the purpose of this report as any grant, whether direct or indirect and specific or general, in money, credit or in kind, or of the use of facilities or services, or any remissions of moneys due, made by a government, or by a group acting for the collective good, for ends deemed productive of public benefit, without compensation therefor."

The great variety of aids to be brought within this definition made it impossible, or at least inconvenient, to use the same basis of computation for them all. Two quite different bases were employed: one, cost to the grantor, the other, benefit to the grantee. Since very different results are reached by these methods, it is unfortunate from the point of view of comparability that the same measurement was not used as far as possible for all carriers. This was not done. Cost to the public was taken as the measure of aid to highway, air, and water transportation, while benefits derived were used almost exclusively for the railroads. Another question of procedure had to be settled: How far back should the investigation be carried? Should it be confined to the period within which the new modes of transportation had become a significant factor in the competitive relations of the the carriers or should it be pursued on the "historical basis"? It is enough to say here that the historical basis was chosen for the railroads, practically the whole of Volume II being devoted to it and to the "current basis" for each of the other modes of transportation, thus impairing the comparability of the findings in the separate reports. A computation of railroad aids on the current basis is finally made, however, for a single year, 1936, and presented in a table together with the aids to the other carriers computed for the same year. The value of this table can be better appraised after an examination of the nature of the public

aids investigated and the methods employed in determining the amount.

III

The period chosen for investigating aids to motor vehicle transportation was very properly the twelve years following 1920. If, as is often done, expenditures for roads and streets were taken as the measure of aid given this form of transportation, the aggregate for the period would, in round numbers, be \$22,000,000,000. But expenditures were held to be but a crude measure of the aid given since those made for construction must be spread over the life of the improvements to arrive at "annual cost," considered in this case the most appropriate measure of public aid. Annual cost was defined so as "to include an amortization or depreciation charge, interest on capital outlays less the cumulated amount of amortization or depreciation, and annual maintenance and other operating expenses."⁵ Calculated on this basis the \$22 billions of expenditures shrunk to \$16.5 billion as the cumulated cost for the years 1921-1932. But these costs were not incurred to meet the requirements of motor vehicle users alone. Roads and streets have other uses. An allocation must be made. The infinitude of details considered in making it indicates the delicacy as well as the immensity of the task involved in determining the cost assignable, not only to motor vehicles as a whole, but to each of some twenty-odd types of them, operating on each of three classes of roadway. The conclusion was that only 80 per cent of State Highway annual costs were assignable to motor vehicles; while from 15 to 31.5 per cent (varying from year to year with construction and use) of county and rural road costs, and from 15 to 28.5 of city street costs, were assignable

⁵ *Public Aids*, Volume I, p. 25.

to motor vehicles. Computed on this basis, the cumulated annual costs, 1921-1932, assignable to motor vehicles were found to be \$5,994,000,000. Adding to this \$25,000,000, the cash value of war materials donated for State Highway purposes (belatedly discovered apparently) the total cost charged against motor vehicles becomes \$6,019,000,000.⁶

Parenthetically it may be noted that one of the major complaints of the railroads in their subsidy propaganda was that their competitors had the use of tax-free right-of-ways. During the investigation they contended that the equivalent of a tax-charge should be included in costs assigned all carriers using publicly-owned facilities. This contention was rejected on the ground that "taxes, except in a very limited and special sense, are not of the nature of a cost." Nevertheless, "a tax item" was set up in the report for each mode of transportation, not for use in determining "aids," but "for use in comparing the economic status of competing forms of transportation." A theoretical tax at the rate of 1.25 per cent was computed on that part of road and street investment assignable to motor vehicle users for each year and, added to costs, is shown in a separate column under the head of "annual cost plus taxes." The tax proved less than might have been expected—a little less than half a billion dollars for the period—making the cost plus taxes \$6,449,000,000.⁷

The \$6,019,000,000 of cumulated annual costs were to be regarded as public aid, however, only to the extent they exceeded the payment made for use of roads and streets. Accepting in a restricted form the "toll" theory of gasoline taxes and fees paid by motor vehicle operators

the Federal Coordinator treated these charges as such payments. Some support to the toll theory is given by certain court decisions upholding the validity of early registration fees as payments for the "use of facilities provided at great public cost" and the same language was used to justify the gasoline tax as it came along. The almost universal allocation of the revenues from these sources to road purposes gave further color to the theory. Although the analogy between these payments and the ancient toll fails at many points, and in spite of the fact that their validity was upheld on quite other grounds—as an excise, a privilege tax, as an exercise of the police power in the interest of safety, and as an exercise of the general taxing power—the theory gained wide currency and is still defended with zeal by automotive and oil interests and by good-roads enthusiasts generally. In its extreme form the theory holds that the revenues from these special charges against motor vehicle users are designed by their very nature for the maintenance of public roads and that all non-highway uses of them are "diversions." While the toll theory in this extreme form was rejected the essential feature of it was accepted. All deficiencies of data, all engineering and statistical difficulties were overcome and computations were made of "user-payments" for each year and compared with the annual costs charged against motor vehicle users. Down to and including 1926, the costs exceeded the payments; motor vehicle transportation was receiving aid. After that date the reverse was true. For the 12 years the assignable costs were \$6,019,000,000; user payments, \$6,132,000,000; the excess of payments over costs, \$113,000,000. So, far from being subsidized, motor vehicle users as a whole more than paid

⁶ *Public Aids*, Volume IV, pp. 18-45. For the several basic tables from which these results are derived, see especially numbers 26 and 27, p. 75 and the unnumbered table at page 159.

⁷ *Public Aids*, Volume I, pp. 6-7; Volume IV, 51-55, and Tables 27 and 28.

the costs assigned them during the period, that is, received no aid. The delay in publishing the report made it possible to make similar computations for the five years, 1933-1937. It was found that the excess of payments for this period amounted to \$387,000,000 and for the 17 years, 1921-1937, it was \$501,000,000.⁸

Computations were also made to determine the balance of costs and payments for some twenty type-groups of motor vehicles. Most of them more than paid their way; a few, among them school buses, farm trucks, and one-and-a-half-ton trucks, had not. As found by the methods approved by the Federal Coordinator, the excess of costs for these "delinquents" over their payments for the year 1932 was found to be \$40,000,000; by 1937 the amount had shrunk to \$8,000,000.⁹ These amounts are the measure of public aid being given motor vehicle transportation, little or none of it in competition with the railroads in those years. The outcome seemed to confirm the view of Mr. Eastman that subsidies to motor carriers were not the chief cause of the financial straits in which the rail carriers found themselves.

IV

Aid to air and water transportation may be dealt with more summarily, since the same procedure was followed for them as for highway transportation. Annual costs were found by spreading construction expenditures over the estimated life of the facility, computing interest on the depreciated investment, adding cost of maintenance, allocating the combined costs, and deducting user payments, if any. The period covered for air trans-

portation was, again very properly, the years 1926 to 1938, inclusive. When all apportionments, allocations, and adjustments were made, it was found that the public aid given air carriers during the period was \$110,836,000 for the scheduled service (including \$64,154,000 on account of the mails), and \$56,600,000 for other than the scheduled service; a total of \$167,463,000. If taxes were included, this total would become \$184,700,000. Computed for the single year, 1936, the public aid was found to be \$14,400,000 for the scheduled, and \$7,000,000 for other than scheduled service, a total of \$21,400,000.¹⁰

The period chosen for detailed study of aid to water transportation was the six years, 1931-1936. The reasons for this restricted period seem adequate, as will be indicated later. Computations of annual costs chargeable to domestic water carriers were made for each of 12 or 15 waterway projects, but the results are not brought together in summary form for showing cumulated and average cost for the period; although they could be derived from the excellent basic tables in the appendix.¹¹ Prominence, however, is given to the aid granted for a single recent year, 1936. The total aid given that year was found to be \$131,565,000 including \$120,000,000 for use of waterway improvements, \$500,000 through Inland Waterways operations, \$665,000 through loss on Panama Canal operations, and \$500,000 from loans to shipping lines. If the aids for 1936 may be taken as average for the period, the cumulated aids for the six years would be \$789,000,000. If, perhaps less justifiably, this average were extended to the twenty-year period of heavy water-way expenditures, 1916-1936, the total would be approximately \$2.5 billion.

⁸ See the tables already cited, and for what may be regarded as a final statement of the findings, Volume IV, p. 159.

⁹ *Public Aids*, Volume I, pp. 27-30; Volume IV, p. 146. For the detailed study of costs and payments by type of vehicle see IV, 81-176.

¹⁰ *Public Aids*, I, pp. 32, 157, and 160.

¹¹ Volume III, pp. 150-162.

While the report does not give in summary form the cumulative annual costs during the period covered by the investigation, it does give the cumulative expenditures of federal, state and local governments for an undefined period. They amounted to \$2,464,000,000. Adding to this the cumulative loss on the Panama Canal operation (\$76 million) and that on Inland Water-Ways (\$15 million) gives a total crude cost of \$3,555,000,000. Deducting \$750 million received from tolls and other user charges there is left \$2,805,000,000 which indicates "in a very elementary, 'out of pocket sense,' the cumulated aid given this branch of transportation." But, says the report: "If, as is necessary, deduction is made of the remaining unamortized cost . . . of facilities provided in 1936 and earlier, this amount would be reduced by \$995 million or to \$1,850,000,000."¹²

V

Aids to railroads require more extended comment. The special report on this subject seems to be out of line with the others in the series and appears to have little bearing on the main purpose of the investigation. The director of the section of research remarks that the reports on the different agencies "so far as possible have been prepared along uniform lines." That is hardly the case. The standards of measurement for railroad aids is, as already pointed out, different from that used for all other agencies—"benefits" realized from grants for railroads; the "cost" to the public for all other carriers. Uniformity of treatment, wherever possible, would have yielded substantially different results. Again railroad aids are reckoned on an "histori-

cal basis"; those for other agencies on a "current basis"—that is taking account only of those being received during recent selected years. The results are not comparable as the report recognizes. Water and rail aids could have been made comparable by dealing with water aids historically; but the reasons given for not doing so seem quite conclusive: "Not only would the making of such calculation have been of a very formidable magnitude, but little or no significance would attach to the results. No problem in the relations of rail and water transportation would be solved if figures of this kind were available."¹³ All this is true; and it is equally true of the "historical" aids found for the railroads. The discovery and evaluation of these grants of assistance was a task of great magnitude, as will appear, and the results have little or no bearing on the announced purposes of the investigation.

A summary view of railroad subsidies granted from 1830 to 1936, as given in Table I, may be taken as a text for the comments which follow.

The most remarkable thing about the aids enumerated in the table is that all except one of those to promote construction are in no sense aids to existing railroads; and the amount of that exception is unduly exaggerated if, indeed, it should be counted at all. The report explains clearly how, in the course of time, subsidies granted to earlier roads have lost that character so far as present ones are concerned.¹⁴ It has come about partly through obsolescence of improvements into which subsidies went, but mainly through changes in ownership. Whenever a *bona fide* change of ownership has occurred, by sale, by consolidation, or by foreclosure, it has been necessary to

¹² This information is given in a footnote, Volume I, p. 37. The losses on the Panama Canal are apparently for the 16 years, 1922-1936, (Volume III, p. 318), and those on Inland Waterways for the 12 years, 1924-1936, same volume, pp.

239-240. The expenditures here given are presumably for the longer of these two periods, 1922-1936.

¹³ *Public Aids*, I, p. 37.

¹⁴ *Public Aids*, II, pp. 101-2; I, pp. 39-40.

make a valuation of the assets and liabilities. If any benefit, aid, or subsidy existed for the old owner, it was reflected in the valuation, paid for by the successor company and ceased to exist. The same process of limiting benefits to the original grantee has gone on in the myriad changes of stock ownership. Only present stockholders in a continuing company who were owners at the time the grant was made can be said to be present beneficiaries of public aids. "When all

these considerations are weighed," says the report, "It appears entirely reasonable to conclude that the net benefit now derived by the railroads as a whole from the construction aids is small and probably negligible."¹⁵ That is to say that the value of the table is purely historical and has no bearing on the subsidy controversy of the nineteen twenties and thirties.

A proper evaluation of the table as a

¹⁵ *Public Aids*, I, p. 40.

TABLE I—SUMMARY OF PUBLIC AIDS GIVEN TO RAILROADS

Form of Aid	Amount of Aid
A. To secure construction of railroads:	
Drawbacks of duties on railway iron, and expense of Federal railroad surveys (p. 4-5).....	\$ 6,000,000
Federal and state land grants (p.52).....	429,000,000
Federal and state right-of-way grants (p.52).....	87,000,000
Lands donated for right-of way and other carrier purposes by local governments, individuals, associations, and private corporations, including apparent aids (p. 56).....	232,000,000
Contributions of cash, material, equipment, construction, labor, and securities by states, local governments, individuals, associations, and private corporations in aid of construction (p. 57).....	63,000,000
Loans by Federal Government in aid of construction of Pacific railroads (p. 60) .	48,000,000
Loans by states and local governments in aid of construction (p. 61)	46,000,000
Guaranty or endorsement of railroad bonds by states and local governments (p. 61).....	25,000,000
Tax-exemption aid to railroads by states and local governments (p. 64)	13,000,000
Aids to railroads by states through grants of banking privileges (p. 64)	1,000,000
Subscriptions to railroad stocks and bonds by states and local governments (p. 66).....	50,000,000
Collective subscriptions to railroad stocks by citizens (p. 66)	87,000,000
Vacation of streets to railroads (p. 70).....	77,000,000
Rights in public domain (p. 70).....	118,000,000
TOTAL, Section A.....	1,282,000,000
B. Aids given from World War to 1936:	
Loans by Reconstruction Finance Corporation (p. 86).....	115,000,000
Loans by Federal Emergency Administration of Public Works (p. 89).....	46,000,000
TOTAL, Section B.....	161,000,000
Grand Total, Aids to All Railroads.....	1,443,000,000

contribution to history can be made only after an examination of the items that go to make up the impressive total of \$1,443 million of aids charged against the railroads. Probably no figure in the four volumes will be more often quoted than that; and it is important that those who quote it and those to whom it is quoted should understand the peculiar sense in which certain terms are used, the peculiar standards for measurements, and the methods of computing aids in this branch of the investigation.

The largest and most controversial item in the table may be considered first—the aid received from the land grants—found to have been \$429,000,000. Before inquiring into the way that sum was arrived at, it is well to note the character usually ascribed to these grants, as “gifts,” “donations,” “public charities.” Even the Federal Coordinator in his Foreword speaks of them as “donations.” This fiction goes back to the first of the railroad grants when opponents argued that Congress had no right to make donations. Senator Douglas brushed the argument aside. “I do not argue the question of our right to donate,” he said, “as we do not propose to donate.” Nor did the later charters providing for grants propose to do so. And now that the nation has received back for the grants “compensation” far in excess of their value however computed, is it not time we should cease our self-pitying lamentations over being worsened in bargaining with the railroads three-quarters of a century ago, and recognize the grants for what they really were: a part of the price paid for a service rendered. They were in line with a policy that goes back to the beginning of our history. James I might have followed the old Greek pattern of colonization and planted colonies directly at government expense, in order to establish his shadowy claim to Virginia,

but he chose to job out the task; to make it worth while for private persons to do it. Land was the chief consideration employed. The grants to all the great proprietors were of the same general character, carrying with them the obligation to “plant,” to “settle,” to “seat” a population on the land. For two-and-a-half centuries the great proprietors themselves, the provincial governments, the confederation, the states, the federal government had used their lands as a sort of currency to achieve desired ends. In these transactions there was generally, if not always, a quid pro quo, actually stated or implied. It was so with the land grant for the first transcontinental railroad which marks the beginning of a new chapter in the long history of that policy. A good deal could be said for a policy of waiting for that or any other undertaking till conditions should justify it as a business enterprise. But in this case the need was imperative and immediate. The government might have built the roads and kept its land; but it, too, chose to job out the task to private companies, offering, among other things, specified sections of land from the public domain for building a road that gave no promise of paying for itself. It was expected that the road when built would return to the public a fair equivalent at least of what it surrendered—in security, expanding commerce, national wealth, and in returns to the treasury in the form of increased taxing power and savings on transportation costs. The offer was reluctantly accepted, the companies taking the risk of realizing on the land, the government of realizing its expected public benefits. If an equivalent had not been expected, the grant would have been a betrayal of trust; Congress had no right to “donate” land to anyone. It matters not at all that the grant of 1862 was the beginning of a ten-year Congressional

debauch of railroad promotion which, when the spree was over, brought the total of federal and state grants to more than 180 million acres;¹⁶ the form, the purpose, and the character of the grants, however ill-advised, remained the same—a part of the consideration paid to get something done that the granting authority wanted done, and not a “donation.”

Returning now to the determination of the amount and value of these grants, it is to be noted that the grants were acres of land. It might be expected that the amount granted and the amount received would correspond; and such is the case, the records of the companies and those of the government being in substantial accord. It might be expected, also, that the value of the land in monetary terms would be the same for grantor and for grantee; but that is not the case as determined by the investigation. Two ways were open for converting the acreage into pecuniary terms: by using the price of the land at the time of the grant or by using the net price actually realized by the companies. The Federal Coordinator rejected the first method on the ground that the prices received by the government during the period when the grants were made do not “furnish any real measure of the potential value to the governments of the enormous tracts which were donated to the railroads.” That is equally true of land sold at the current price to settlers or to forestalling speculators. Future increments were taken for granted by everyone and were doubtless considered by grantor and grantee in fixing the terms of the charter contract. Whatever the potentialities were, however, they went with the grant and at the time of the grant—the tail with the hide. It was well understood that no increment in value would occur automatically.

Great areas had been for sale at \$1.25 per acre since 1920 with few takers west of the Missouri. The chief factor expected to operate to increase the value of company land and of public land as well, within and far beyond the land-grant belt, was the railroad itself. And it was so. The railroad made the fruitful occupation of a whole region possible. The Homestead grants further stimulated settlers to occupy. These grants like the railroad grants exacted a price: occupation and improvement. Neither is to be regarded as a gratuity. Both were designed to achieve the same basic purpose already noted: to put half a continent, mostly idle, to work in the public interest.

Although cost to the government was rejected as the measure of aid given to the railroads, a calculation on this basis was made for information only. It was found that the average price of land sold by the federal government, 1850 to 1871, was 97.2 cents per acre. Using this as the best available measure of the acre value of the grants when made, the total value of the grants, federal and state, after all adjustments were made, was found to be \$178,000,000. Inasmuch as the object was to find the amount of *aid* given the roads, the Federal Coordinator held that this would be best measured by the benefits derived from the grants as shown by the net proceeds from sales and the estimated value of lands still retained by the roads. The Interstate Commerce Commission had for some years before this inquiry been collecting information on the subject. The details of sales, so far as could be determined, are set out in one of the most elaborate tables in the report.¹⁷ The gross receipts were found to be \$570,700,000. Deducting from this the reported cost of administering and selling the land, \$131,000,000, the net proceeds from sales were found to

¹⁶ *Public Aids*, II, Table 13.

¹⁷ Volume II, Table 13, pp. 107-118. See also pages 37-40.

be \$439,700,000. A considerable acreage was still retained for sale estimated to be worth \$3.06 per acre and the same value was given to lands claimed by the roads not yet patented to them. The value of these unsold lands was found to be \$49,600,000 which, added to net sales, gave a total of \$489,600,000 realized by the roads for the grants.

As in the case of the motor carriers, if any part of these benefits was paid for, the payments should be deducted from the "benefits" to arrive at the aid given. The land grant act of 1862 was designed not only to "aid in the construction" of certain roads, but also "to secure to the Government the use of the same for Postal, Military, and other purposes." Nearly all of the grants, in one form or another, placed an obligation expressed or implied, on the roads to give preferential treatment to government traffic.¹⁸ After much contention over the meaning of the laws, a settlement was reached for all the roads concerned by which the preferred treatment was to take the form of a reduction of commercial rates for transporting government traffic. Down to June 30, 1934, these concessions, as far as could be determined, amounted to \$138,700,000. This amount, however, was not allowed as an offset "payment" against the benefits charged. The reasons given were, (1) that the rate concessions were not a burden on the aided roads since they did not interfere with the carriers' constitutional right to earn, "if they could," a fair return on the property employed; (2) that losses from rate-concessions were presumably recouped by higher commercial rates, thus making the patrons of the roads the real bearers of the burden

and the source of savings to the Treasury; and (3) that part of these savings was due to the fact that under arrangements with the land grant roads, many unaided roads voluntarily accepted government traffic at the reduced rates in order to secure a share in it "for the sake of profit."¹⁹ The implication of the argument is that none of the savings to the government should be regarded as offset payments against benefits. As will be seen, however, a small part of it was so counted.

An obligation of a different kind was attached to the Illinois Central grant of 1850. The charter required the road to pay a perpetual tax equal to 7 per cent of its gross receipts in lieu of all other state taxes. So far as this tax was in excess of taxes the road would have had to pay had there been no land grant, it is to be regarded as a payment for the aid granted. The investigation showed that by the end of 1934 the cumulated excess was \$29,500,000. After a discussion of a discursive nature of possible methods of dealing with rate concessions, the report concludes "that a liberal estimate of the capital deduction which should be made on account of the yearly burdens imposed by the rate concessions and the tax obligation is not in excess of \$60,000,000."²⁰ The difference between the offset items allowed and the total of tax payments and savings to the Treasury through special rates shows that rate concessions were scaled down \$108,200,000 or 78 per cent. If both items had been accepted at their face as offset to "benefits realized," the amount of aid from land-grants would have been \$320,000,000 instead of the \$429,000,000 carried in the table.

But the chief objection to this item is that it is calculated on the basis of what

¹⁸ The subject has been fully discussed by Professor D. M. Ellis, in *The Journal of Land & Public Utility Economics*, August 1945, pp. 207-222. See also G. Lloyd Wilson, "Railroad Land Grant Rates," *Journal of Business*, July 1942, pp. 266-278.

¹⁹ While there was no legal compulsion for unaided roads to accept this traffic, there was an economic compulsion. It

is elementary in railroad economics that it is profitable for a road operating at less than capacity to take additional traffic at rates that will add to net earnings—at rates that would be ruinous if applied to all of its traffic.

²⁰ *Public Aids*, Vol. II, pp. 47-48.

the roads eventually realized from the grants. No one thinks of evaluating individual grants in that way. In converting, say a Homestead grant into monetary terms, the common sense rule would be: The value of the thing granted is the value of the thing received, regardless of the "aid"—the net addition to assets it finally gave the successful settler. Why a different rule for corporations? If the value of the railroad grants at the time made had been used in the computation and full credit for rate concessions had been given by the Coordinator, there would have been less than \$10 million of land grant aid to record in 1934 when the account was closed, and by the time the report went to press, none at all.²¹

The effect of including increments of value after the grant in determining the amount of aid given is seen in another large item. It was found that during a hundred years of railroad construction from coast to coast, public authorities had granted some 661,000 acres for right-of-way purposes which were still so used in 1927. In 1930 the Interstate Commerce Commission valued this land for rate-making and other purposes and found it to be worth \$87,000,000, or \$131.18 per acre. This was taken by the Federal Coordinator to be the amount of public aid received by the railroads from this source. Inasmuch as these lands were intended for carrier use and not for sale, the Board of Investigation and Research created by the Transportation Act of 1940 rejects this method of determining right-of-way aid as unreasonable and substitutes, as seems right, the following rule in such cases: "The value with which the

Government parted and the value which the railroads received is the estimated value of the acreage at the dates the grants were certified." Computing their value at 97.2 cents per acre used to determine the value of the land grants proper would give an aggregate value of approximately \$643,000. This the Board regarded as too low, especially in view of the fact that right-of-way grants continued long after 1871, often through settled communities. In the absence of any investigation of the matter, the Board expressed the opinion that the value of these grants when made "was not more than a million or two dollars . . . a rough estimate of what the railroads would have had to pay for their rights-of-way if they had not been granted to them."²² The reasoning used here seems to the present writer equally sound when applied to the land grants proper.

A surprising amount of right-of-way lands was also acquired from "local governments, individuals, associations, and private corporations." The aggregate from these sources was just under 840,000 acres. For part of this, some 316,000 acres, the railroad records do not show that any payment was made. Although the companies contended that private persons and associations generally expected and in fact did receive compensation in some form, these lands were held by the Coordinator to be donations. About five-eighths of the total, however, passed ownership for a consideration, sometimes nominal, sometimes for value, in what proportion not known. These lands had long been classified by the ICC

²¹ *Public Aids*. II, pp. 40-48, and Table 18 in the Appendix: Vol. I, 12-14. The Board of Investigation and Research follows the method used by the Federal Coordinator in computing the value of the grants and finds an even larger amount realized as of December 31, 1941—a total of \$495 million. It applies against this, however, the full amount of rate concessions which by June 30, 1943 amounted to \$580 million. The gross receipts tax as of that date amounted to \$34.6 millions and the two items totaled \$614.6 million.

The Board states that current savings to the Treasury at that time were about \$20 million per month; and, as heavy movements of troops and war materials continued unabated for two years and in diminishing volume well into 1946, it is probable that the concessions down to October 1 of that year when they were abolished, amounted to more than a billion dollars. *Public Aids to Domestic Transportation*. House Document No. 159, 79th Congress 1st Session. (Sept. 1944), pp. 111-134.

²² *Public Aids to Domestic Transportation*, pp. 143-146.

as "apparent aids," no attempt being made to determine the extent to which they were paid for. The Coordinator, with no better information, assumed that one-half of them, about 260,000 acres, was virtually donated and so treated it. The acre value of the lands at time of acquisition was as little known as the terms of transfer. "However," says the report, "making use of an informed approximation, their average value may be set at approximately \$40." On this basis the value of these lands "to the donors or grantors as of the dates of donation or grant," was found to be \$23 million. But this is immaterial for the purpose of this report. In 1930 the ICC Board of Valuation appraised the lands in this category treated as donations at \$232,000,000, and this was taken as the amount of "public aid" granted. As a whole they had increased ten-fold in the hands of the carriers. One sub-class of them was valued at \$1,896 per acre. One trouble with this method of reckoning public aid is that the full amount of the benefaction cannot be known till the scroll is finally rolled up.

But the objection to this \$232 million item is not due solely to finding the value of the lands to the grantors one thing, and the value to grantees ten or fifty times as great, but rather to the assumptions employed, and to the use of terms in other than their usual sense. On these grounds there seems ample reason for discarding practically the whole of the item. Of the 800,000 acres still used for carrier purposes, only 2,404 acres were conveyed by a public authority; the rest by "individuals, associations, and private corporations" assumed to be "acting for the collective good, for ends deemed of public benefit," and "without direct recompense," thus bringing the benefits derived from these transactions within the classification of "public aids as defined

for purposes of this report." But were they "public" in any real sense? The same question arises in connection with another group of grants treated as public aids; and to these we now turn.

This unusual meaning of "public" is employed also in estimating the aid found to have come from "collective subscriptions to railroad stocks by citizens of communities in aid of construction," amounting to \$87,000,000. Information concerning these transactions is scant. A detail table in which the report is so rich is wanting. The paucity of factual material made it necessary to find a statistical short-cut and to rely heavily on assumption. The calculation seems to be based mainly on what is known of the "collective subscriptions" in Wisconsin during the decade of the fifties. A careful study by Frederick Merk of the so-called "railroad farm mortgages," which later so plagued the state politically, shows that some 6,000 farmers during the decade bought railroad stock to the amount of $4\frac{1}{2}$ or 5 million dollars. This, the report notes, was at the rate of \$6,900 to \$7,700 per mile of railroad in the state in 1858. To get a conservative average for the whole country since 1830, the report scaled the Wisconsin average down \$4,000 per mile; and, applying this to the railway mileage of the country in 1875 (exclusive of the Pacific roads), an "informed approximation" of \$290,000,000 was arrived at as the amount of stock bought by this class of subscribers. Assuming further that if these shares, purchased at par, had been sold to "ordinary" subscribers they would have brought \$70 per share, public aid to the amount of \$30 per share, or a total of \$87,000,000, was found to have been given.

It is always difficult to weight the mixed motives of men, even in the simplest matters, and the greater the number

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involved the greater the difficulty in determining the dominant motive. While the merchants who in the early days of railroad construction invested for instance in neighborhood railroads may have thought of themselves as "acting for the collective good, for ends deemed productive of public benefit," they also cherished visions of dividends and expanding trade. And so of the thousands of others in this category. Calling these transactions "subscriptions" instead of purchases does not change their character. In the classic case of the Wisconsin farmers, Mr. Merk leaves little doubt as to the dominant motive. These farmers may be assumed to have been public-spirited and duly regardful of the "collective good;" but the fact is, a most flattering prospect was spread out before them by the railroad promoters. The mortgage notes they gave for the purchase of stock bore 8 per cent interest, the railroad was to pay 10 per cent dividends which, after paying interest, were to be left with the company to accumulate at the rate of 2 per cent per annum. The farmer, says Mr. Merk, "calculated that by the time his note was due the accumulated dividends upon the company's books would already have paid 20 per cent of it. In addition his stock would by that time be worth far more than the par price he had paid. It would then become a question for him to decide whether to sell his securities and with the proceeds cancel his mortgage or keep the stock as a ground-floor investment."²³ But some of the roads were bankrupt when the purchases were made and others became so through construction company frauds and other devices known to high finance. Such

benefits as came to the railroads through these purchases require a harsher and more accurate name than public aids.

The free use of assumptions in the report encourages the reader to make some of his own. This reader assumes that the stock and bond purchases in this category, as indeed the government subscriptions, should be regarded as investments; that they aided construction in just the way "ordinary" purchases did and in no other; that the subscriptions were not collective but individual; that it matters not at all whether the decision to buy was made at a mass meeting of "citizens of the community," or while reading a prospectus or the county paper, or while following the plow; and that the aid they gave was in no sense public except in that used "for the purpose of this report."²⁴

Five items in the table relate to public loans to the railroads, and to company bonds guaranteed by the states. The aggregate of these was found to be nearly a billion dollars and the aid realized from them was reckoned at \$280 million. The calculation was made according to the formula used to determine aids from public purchases of railway securities: by taking, in this case, the difference between the interest paid by the roads on government loans and the amount they would have had to pay private investors. Thus the 64.4 million dollars loaned the early Pacific roads were estimated to have given "aid" to the amount of \$48 million. The Board of Investigation and Research dealing with the same set of facts, but holding it a sound principle to measure aid from public loans "in terms of cost to the lenders," found the aid from these loans to be \$74.3 million.²⁵ As to aids

²³ Frederick Merk, *Economic History of Wisconsin During the Civil War*, Madison, 1916, Chapter IX; Frederick Cleveland, *Railroad Promotion and Capitalization* (New York: 1909). Chapters XI and XII.

²⁴ *Public Aids*, II, pp. 65-66 and Table 22, pp. 149-159.

²⁵ Made up of \$63.3, the cost of interest payments by the government during the life of the bonds, and \$11 million loss

from defaults of principal and interest, of the small roads included in the loan. The loss from deferred-interest payments was computed by compounding the principal annually at 6% for 30 years, deducting the principal and interest

(Footnote 25 continued on page 354)

from state and local government loans, reckoned by the Coordinator at \$46 million, the board can find no reliable data for calculating aid beyond some \$23 million representing losses to the public of principal and interest. The Coordinator's estimate (of \$25 million of aid through the state guarantee of railroad bonds) the Board, without venturing an estimate of its own, dismisses with the remark that "this figure is only an 'informed approximation' based on scanty data, and it may be questioned whether rates assumed to obtain in private money markets should be used as the norm or standard for determining public aids."

All the foregoing aids were to promote the construction, or to influence the location, of roads. In recent years the federal government has used its credit freely in a great variety of ways to relieve financial distress in many fields—transportation, industry, agriculture, and among real estate owners and the working classes. The railroads have been beneficiaries of this policy. Relief was given them chiefly through the Reconstruction Finance Corporation and the Public Works Administration, the latter designed primarily to relieve unemployment. The assistance given was not a gratuity. Loans could be made only on "full and adequate security" approved by the ICC, at 6 per cent interest at first, but by successive changes reduced to 4 per cent as the administration's plan for reducing the general interest rate of the country developed. Down to the close of 1936 the government had disbursed to the railroads through the RFC \$517,000,000 and through the PWA \$201,000,000. That these loans were of great assistance to the

roads is beyond question; they conferred "benefits." The formula used for measuring aids to railroads made it possible to calculate them the moment the loans were made without awaiting the outcome of the transaction. It requires a certain daring to undertake to calculate the benefit to each of a long list of roads in varying degrees of financial distress, from those who borrowed from the government "as a matter of convenience rather than necessity" down to those who were on the verge of bankruptcy. But this, or something like it, was done and it was found that the public aid given the roads through RFC loans was approximately \$115,000,000 of which \$102,820,000 was due to savings of interest and \$11,740,000 to savings of bankers' commissions; while the PWA loans gave aid to the amount of \$46,000,000, a total of \$161,000,000.²⁶ The Board of Investigation and Research remarks with apparent restraint that "there is no compelling reason in principle for taking alternative costs of capital obtained from private sources as the standard or norm for determining public aid when funds instead are provided through governmental channels;" and especially, in this case, since "the lending policy of the Federal Government was intended to reduce charges demanded by sources of private capital."²⁷ Moreover, in calculating benefits by this method, says the Board, "so many intangible and hypothetical considerations would be encountered that the results which could be obtained would necessarily be highly speculative." The implication of these remarks is, and it seems just, that the

end of the seventies half of the interest-bearing war debt had been refunded into 4 percents and during the next decade some conversions were made into 3½ per cents. There seems no reason for compounding these new advances at 6 per cent where the government could borrow at 3½ or 4 per cent.

²⁶ *Public Aids*, II, pp. 86 and 89. For the list of roads receiving loans, see tables 34 and 35 in the Appendix.

²⁷ *Public Aids to Domestic Transportation*, pp. 175-187, especially 183.

(Footnote 25 continued from page 353)

paid at maturity, and deducting further, sinking-fund and other payments made by the roads, compounded at the same rate from the time made till settlement. If the Board had treated each interest payment as a new loan and had taken into account the great improvement in government credit, the estimate would have been much lower. By the

charging of any aid from these loans is premature. If, as is to be expected, the roads repay the loans and pay the interest on them, the very real assistance given will have been paid for; and, after the analogy of the motor vehicle carriers, no "aid" will have been given.

A few other aids remain to be considered briefly. During the 1830's Congress allowed drawbacks of customs duties on iron used by railways to the amount of \$6,000,000. This was a real aid; it reduced the cost of construction. Aids to the amount of \$13,000,000 were found to have been given by state and local governments through tax exemptions, usually for a term of years, sometimes in perpetuity. In view of the Federal Coordinator's rejection of theoretical taxes on public property as a factor in determining aid to motor and water carriers for the reason that "taxes except in a limited and special sense, are not of the nature of a cost,"²⁸ it seems illogical and out of harmony with other parts of the report to treat taxes saved through exemption as a business cost saved and therefore an aid. An example of the meticulous care with which railroad aids were sought out is found in a small item for the use of surveys made at government expense. Down to 1828, about 60 of these surveys had been made, and half of these were found to have been utilized in some measure by railways. Little could be ascertained as to the benefits or the cost of these surveys; but, says the report, "while the amount involved is small, it may be worth while to set down, as an estimate, \$75,000 as the aggregate cost of these surveys;" and this amount is included in the grand total of aids. An aid of \$1,000,000 was found in the grant of banking privileges to railroad companies by certain Southern states—a policy for which there was precedent in similar

grants to the early canal companies of the North. If the grant of non-carrier privileges is to be regarded as a public aid there seems no logical reason why the investigation should not have been extended to the mining, manufacturing and merchandising privileges enjoyed by many railroads.

In addition to grants of land for right-of-way, the railroads have received the right to the exclusive use of streets, sometimes with, usually without payment. The number of these vacated streets was so numerous that in making a valuation of them the sampling method was used. Three representative railway systems were chosen, the street area of all "vacations" ascertained, and the cost of acquiring those paid for was used for determining the value of those for which no payment was made. These areas and values were then used for estimating the value of street vacations not paid for on all roads. It was found to be \$22,000,000. But the ICC valuation of these same streets in 1930 was \$77,000,000, and this was taken as the measure of public aid derived from this source.

Street "occupancies," mainly of intersections, differ from "vacations" in that the right of use is shared with the public. There are many thousands of these grade-crossings throughout the country. Following the procedure just described, but using linear measurements instead of area in the computation, the value of all occupancies at time of acquisition was found to be \$118,000,000. The value of these rights has doubtless increased with the intensified use of them. No way was found, however, for determining their present value; and value at time of grant was in this case used and it appears in the table under the head of "Rights in Public Domain."

The Board of Investigation and Research in dealing with the railroad use of

²⁸ *Public Aids*, I, pp. 6 and 30.

streets and crossings, concludes: (1) that street vacations "should be regarded as public aids, and their value for this purpose should be measured by their worth at the time the grants were made;" and, as to street crossings, that, (2) "in view of their limited rights in the joint use of streets, and taking into account the substantial obligations of the railroads in connection with these street occupancies, there is not an adequate basis for concluding that these rights of joint occupancy have conferred any public aids upon the railroads."²⁹

But this item of aid from "rights in the public domain" is of particular importance to the Federal Coordinator. It is

the only aid to construction that has not lost its character as such; the only one that has, if valid, any bearing on the announced purpose of the investigation. It appears not only in the historical table but also in the final and only Tabular Summary of aids to all forms of transportation. (Volume I, p. 41). The table does not compare all aids for a series of years within the period of the subsidy agitation, as might have been expected, but for a single year, chiefly, 1936. In reading Table II, it should be kept in mind that the Board of Investigation and Research

²⁹ *Public Aids to Domestic Transportation*, pp. 151-156. For the Federal Coordinator's findings on these aids see *Public Aids*, II, pp. 66-71 and Tables 25 to 33.

TABLE II—COMPARATIVE VIEW OF AIDS FOR 1936

Agency, and Form of Aid	Amount	Percent
Steam Railroads, 1936:		
R. F. C. and P. W. A. loans.....	\$ 26,000,000 ¹	13.5
Use of waterway improvements.....	2,850,000	1.5
Use of Public Domain.....	6,785,000 ²	3.5
TOTAL.....	35,635,000	18.5
Water Transportation:		
General waterway improvements, less \$2,850,000 assigned to railroads, 1935.....	126,150,000	65.3
Loss on operations of Inland Waterways Corporation, 1935.....	400,000	0.2
Loss on operations of Panama Canal, 1936.....	665,000	0.3
Loans to and mail contracts of domestic shipping lines, 1936.....	1,500,000	0.8
Less duplication between first and second items.....	187,000	....
TOTAL.....	128,528,000	66.6
Air Transportation:		
Scheduled air transportation, 1936.....	13,990,000	7.2
Domestic civil air transportation other than scheduled air transportation, 1936.....	7,020,000	3.6
TOTAL.....	21,010,000	10.8
Motor-vehicle transportation, operators of certain groups of vehicles, 1937..	8,000,000	4.1
GRAND TOTAL.....	193,173,000	100.0

¹ Estimated by taking 4 per cent of the "average monthly balance of loans outstanding in 1936."

² Arrived at by taking 5¼ per cent of \$118,000,000, the estimated current value of joint occupancy rights in streets and intersections.

properly, it seems, rejects the two major items charged against the railroads, leaving their use of public water-way improvements the only source of aid for that year and presumably for the period.

The table bears out the contention of the railroads that their competitors were receiving substantial aid, but it does not disclose the full extent of it. A year-by-year comparison for the period or the selection of an earlier year within it, would show more adequately the weight of the handicap of which the railroads complained. Moreover, the table does not disclose the advantage of water, motor, and air carriers due to their use of tax-free facilities. "This fact," says the report, "does not have a bearing on the amount of public aid received, but it does enter into the picture as a factor in the terms of competition between agencies which provide their own right-of-way facilities and those which do not."³⁰ Here, again, we come upon the anomaly already noted that taxes are a cost to the railroads and relief from them is aid, while relief from them is not an aid to the other carriers. It is unfortunate that devotion to a formula should be allowed to obscure the prime purpose of the investigation which was to ascertain the effect of public policy on the competitive relations of the several types of transportation. If relief from right-of-way taxes had been treated as aid to those enjoying it, there would have been charged to the air carriers approximately one million dollars, to the water carriers 20 million, and to users of motor vehicles 58 million, more than appears in the table. (*Public Aids*, I, p. 41). On the other hand, if, as

seems altogether just, the conclusions of the Board of Investigation and Review noted above are accepted and the two large items charged against the railroads are excluded, the rail carriers would be shown to have received about 1.5 per cent of the total of aid for the year instead of the 18.5 per cent charged against them.

It is not this table, however, but the longer historical one with its impressive grand total of \$1,443,000,000, that is most likely to be quoted. It should be used with caution. Those who use it should know something of the theories, the assumptions, the methods employed in constructing it. They should know that other government agencies, fully as competent in such matters as the Coordinator's division of research, have rejected entirely several of the larger items and have greatly reduced most of the others. Above all they should know that the long list of aids to secure construction went to a past generation of railroad owners and are in no sense aids to present owners. It might easily happen in a period of unrest that unscrupulous agitators, ignorant of, or ignoring, this fact, may seize upon this grand total of calculated aids; add a billion or so for the incalculable ones mentioned in the report; and, magnifying the proportion these "public donations" to the present value of the nation's railways, make it the basis for urging that the system or some part of it be taken over by the government without further remuneration. The name for such a procedure is, of course, confiscation.

³⁰ *Public Aids*, I, p. 41.

The Neighborhood: A Socio-Psychological Analysis¹

By JUDITH TANNENBAUM*

Introduction

OVER and above the physical level of health and safety, the crucial problem of contemporary city life is a social one: How can we make the urban environment socially satisfying to the individual? How can the community contribute toward the stability, security, and sound integration of the individual personality? What measures must be adopted to make the city a place to which people can adjust satisfactorily in the process of normal group living?

Too often these fundamental questions are lost sight of in the planners' preoccupation with the elementary physical needs of the community. Circumstances have forced the planner to occupy himself with open spaces, schools, playgrounds, housing, and efficient belt-highways, while the social scientist has offered few clues to the enigmatic problem of social adjustment to the urban environment. In reality, however, it is the *latter* which must be the end of all planning. For it is entirely possible for the physical problems of city life to be solved, leaving the social ones in an even more aggravated state.

This study concerns itself with the techniques developed by city planners to meet the socio-psychological problems that have become endemic in the contemporary urban environment. Specifically, attention will be focused on one central planning concept which is particularly relevant to the problem at hand: the neighborhood concept. In what ways, and to what extent does the neighborhood concept propose to deal with the non-physical problems of city life? Ad-

vocates of the neighborhood concept make it the foundation stone of urban organization and claim for it far-reaching effects, not only on the physical life of the city, but on the personal adjustment of the individuals living there. This paper will examine the latter claim in terms of the fundamental socio-psychological problem to be solved.

In order to elucidate the nature of the social problem in an urban environment a concept developed by Emile Durkheim will be used. This French sociologist coined the term "anomie" to describe a particular form of social disorganization and maladjustment in society.¹ Durkheim was concerned with the effects of such a state of disintegration on the personal happiness and adjustment of the individual. His studies indicated that extreme forms of anomie so affected the individual as to result in suicide—a personal preference for death rather than life. On the basis of this analysis, he came to use the suicide rate as an index of the maladjustment and disintegration prevalent in a society.

It will be seen from what follows that the major social problem of city life is precisely one of anomie. Not only does Durkheim's suicide index show a high degree of anomie to be prevalent in cities, but the definition given identifies it unmistakably with the socio-psychological situation which is at the heart of urban maladjustment. This does not mean that we are transferring Durkheim's theory of anomie bodily into the planning field, but only that we are making use of this very fruitful concept to point up certain aspects of the planning problem.

¹ The author is deeply grateful to Catherine Bauer for her helpful comments and constant encouragement in the preparation of this paper.

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¹ Emile Durkheim, *Le Suicide* (Paris: Librairie Felix Alcan).

For this reason the crucial urban problem is defined, for purposes of this study, as *anomie*.

Anomie and Its Implications

What do we mean by *anomie*? In what way is it synonymous with the problem of urban maladjustment?²

An operational definition will indicate the conditions under which *anomie* may be said to exist: An anomic society is characterized by weak group integration and a lack of cohesion between members of the collectivity. In Durkheim's phrase, the "conscience collective" does not operate to unify individuals, to give them a feeling of common belonging. People do not feel the existence of the group, or at best it is but weakly conceived and is in no position to exercise any control or influence.

The nature of *anomie* is strikingly pointed up by the description of a situation under which it does *not* exist. Durkheim found that in societies having a strong group feeling there is a consistently low suicide rate (or a low incidence of *anomie*). Examples of such societies are the Jewish or Catholic groups, in which the group consciousness is very highly developed. Both of these religions require strong positive identification of the individual through a common religious heritage, common beliefs, and numerous rituals. In addition, constant persecution has forced these groups to be thrown back into themselves, the consequence being a highly developed conscience collective.³

Group support is the strongest factor making for security in the individual. Support and recognition by other individuals, or even more important, by a group as a whole, give the person a feel-

ing of being wanted and approved. To be accepted by a group means that one has made the grade, that one is as good as the next fellow. But in a society which is disintegrated such group feeling does not operate. For all practical purposes the group does not exist for the acceptance or rejection of the individual; and if, in addition to group disintegration, individuals function as isolated atoms having no emotional ties to others—the possibility of acceptance or approval by other individuals likewise disappears, and the individual attains no personal support either from individuals or from groups.

In an anomic society individuals are not able to identify with a group. They live as isolated, solitary atoms with no common bonds to bring them together. The forces in such a society are almost entirely centrifugal, driving the individual away from the group, into himself. Complete preoccupation with self is a characteristic of extreme *anomie*. In an emotionally solitary situation, with only themselves to fall back on, such individuals are easy prey to psychological disturbances. In terms of the society, such a situation inevitably leads to disintegration, for a society can exist only by virtue of the fact that individuals identify and actively feel themselves to be part of it.

The implications for the personality are self evident from the very nature of *anomie*: complete isolation of individuals must be accompanied by deep insecurity. This is not the place to discuss the problems of cause and effect; it can be said with certainty, however, that insecurity is *correlated* unmistakably with *anomie*. Even the elementary support of response and recognition are denied the person who is completely isolated. Having to rely solely on his own personal resources for ego support, he is hard put to main-

² The definition to be given is a free paraphrase of Durkheim's definition as stated in *Le Suicide* (ibid.) For purposes of this study attention has been focused on those aspects of the definition which point up the urban problem.

³ Emile Durkheim, *op. cit.*, p. 159.

tain his self-esteem. For self-esteem is largely a reflection of outside evaluation.

The individual in an anomic society does not interact with other individuals, and consequently has no opportunity to release tensions. His isolation makes it necessary for him to reconcile all conflicts and aggressions within himself—a highly unsatisfactory system of adjustment. Furthermore, it is a fact that personal growth and development occur to a large measure in a group situation where the individual interacts with other people on the level of ideas and emotions. All this is denied to an isolated individual who is unable to make himself part of a group. Such a person cannot help but be stunted in his emotional development.

The group is particularly important in the development of the child. A child, given response and security in the family, will at an early age generalize his optimistic attitudes to the larger groups with which he gradually comes into contact—the neighborhood play group, the school, and eventually the entire community. This does not mean that a child must remain “tied to his mother’s apron strings.” However, unless the response he receives in the larger group is to a large measure consistent with the response he expects on the basis of his earlier experiences, radical maladjustments may occur. To come closer to the point, for a child to move from an intimate family group into an anomic society where he finds himself isolated and unable to identify with a responsive group, can result in serious repercussions in terms of his personal adjustment.

By now it should be clear that the anomie which we have been describing is synonymous with the socio-psychological condition which has become endemic in modern urban culture. Erich Fromm has described a very similar situation in his

penetrating analysis of western culture patterns, *Escape From Freedom*.

The disintegration, lack of group cohesion, isolation of individuals and resulting insecurities are familiar phenomena to anyone acquainted with life in the great cities. Their prevalence and intensity vary directly with the size of the community. To a large measure, however, this pattern is being absorbed into smaller cities which consciously emulate their giant prototypes. Physical and cultural imitation have resulted in the rapid diffusion of many aspects of metropolitan life, not the least important of which have been attitudes and feelings conducive to the development of anomie.

So that while anomie may not be the rule in most small and medium sized American cities, it is nevertheless extremely prevalent in the great metropolitan centers. Group solidarity and “conscience collective” may still persist in many communities, but anomie is becoming increasingly widespread as metropolitan culture sweeps out to engulf the country. This is not a chance or ephemeral situation; a probing examination of metropolitan culture will reveal it to be peculiarly conducive to the existence of anomie. This is not the place to examine the cause of this situation. We are concerned simply with the existence of the phenomenon and, assuming it is undesirable from a social point of view, with planning techniques for its elimination.

At this point, a clear-cut distinction should be made between anomie as described here and *anonymity* in city life. Anonymity, for this purpose, may be defined as a situation where individuals are free to carry on a *private* life, without its every detail being known by the neighbors. Anomie *may* accompany anonymity, but not necessarily so. Individuals can have strong group attachments while at the same time moving freely and inde-

pendently in a larger society. An individual does not have to be known personally by everyone in a community in order to have strong group affiliations. By and large, anonymity applies to situations outside the primary group. The contrast between the two should be made crystal clear: anonymity is a desirable end toward which cities should be planned; anomie is an evil to be eliminated. As will be pointed out subsequently one of the most important functions of the neighborhood is to prevent anonymity from leading into anomie.

The Neighborhood

The neighborhood unit has been proposed by many planners as a means of providing physical advantages as well as social adjustive benefits to the urban dweller. The following section will examine the latter claim as stated in the literature on the neighborhood unit. What can the neighborhood contribute to improve city life in terms of the fundamental problem with which we are dealing? To what extent are the advocates of this technique justified in their claims? In short, can anomie be eliminated or basically uprooted from urban society by the use of the neighborhood concept?

Most of the literature dealing with the neighborhood concept focuses attention almost purely on its physical aspects: the super block, the shopping center, the road pattern, the green spaces, the organization of the houses. If mentioned at all, the social aims are discussed cursorily and with a minimum of space devoted to them. Clearly, advocates of the neighborhood consider its main value to lie along physical lines, with the social benefits as convenient after-thoughts which can't hurt and may be helpful. Rather than placing the social values at

the core of their planning and orienting all action toward them, advocates of the neighborhood scheme have relegated these basic values to the periphery of their program.

Clarence Perry, originator of the classic neighborhood concept, devoted almost his entire monograph to a discussion of the physical aspects of the neighborhood. He is concerned with *convenience* for the resident: convenience in shopping, convenience in education, convenience in reaching parks and playgrounds. One gains the impression that the fundamental *raison d'être* of the neighborhood from his point of view was to make life easier and more convenient for the citizen. This motive is not to be questioned—except in its *relative* emphasis and value in the scheme.⁴

Perry was concerned with preserving the residential character of an area. To this end, he recommended banding together into neighborhood units for the express purpose of preventing the encroachment of other uses. This proposal was not based primarily on the need for social cohesion or group solidarity but merely on the desire to keep up the real estate values.

Henry Wright, in *Re-Housing Urban America*,⁵ barely mentions the social aspects of community planning. Tracy B. Augur favors the neighborhood scheme on the grounds that "it would be capable of resisting the tendencies to depreciation and disintegration that might take place in the city around it."⁶ Clarence Stein feels that the neighborhood is valuable in that it permits the greatest possible freedom in the layout of blocks, streets, shopping centers, schools, and recreation areas.⁷

⁴ Tracy B. Augur, *Some Minimum Standards in Site Planning* (Proceedings Joint National Conference on Housing, 1935), p. 50.

⁵ Clarence Stein, "City Patterns: Past and Future," *New Pencil Points*, June 1942, p. 52-53.

⁶ Clarence A. Perry, *The Neighborhood Unit* (Regional Plan of New York and Its Environs, Vol. VII, 1929).

⁷ Henry Wright, *Re-Housing Urban America* (New York: 1935).

Every one of these leading planners favors the neighborhood on various non-social grounds which are unquestionably sound in themselves. But, from our point of view, these planners have oriented their thinking in a mistaken direction. There is no doubt that these physical aspects of the neighborhood are important, even vital; nevertheless all planning should be oriented primarily toward certain established social values which will make for satisfactory personal adjustment in an urban environment.

Despite a mistaken emphasis in theory and in practice the neighborhood theory still has much to commend it in terms of solving or improving the problem of anomie. This concept, which was developed primarily for other purposes, *can* be used for ends which were originally merely subsidiary to the central aims. In other words, the social problem, once subsidiary, can be made central for the neighborhood concept.

Most planners are somewhat aware of the social benefits to be derived from the neighborhood structure: they simply do not regard it as basic. By focusing on their statements regarding the social functions of the neighborhood, light may well be shed on the possible effects of the neighborhood on the elimination of anomie.

Perry devotes the last few pages of *Housing for the Machine Age*⁸ to the social problems to be cured by the neighborhood scheme. He comes very close to a recognition of the anomie of city life when he says that the "vast number of urban dwellers are not acquainted with the people living next door . . . Face to face condition is a normal feature of the environment of society and man tends to degenerate when it is missing."⁹ Perry recognizes that the group sets the

pattern of behaviour and mores for the individual. Without a functioning group relationship, the individual fails to live as a member of society. For it is the "we" feeling that prevents totally erratic and uncontrolled behavior; without such group attachments, no control can operate. From Perry's point of view, the small neighborhood unit of 5000 people is eminently suited to the development of group consciousness, "we" feeling.

Perry also indicates an understanding of the importance of the primary group in personality formation. Outside of the family and the school, the community play group is the one in which the child spends the largest amount of time. Here he comes in contact with other individuals of his own age on a level of give and take, play and conflict. A satisfactory experience in the primary play group will give a child a feeling of deep security that may well last him throughout his life. The importance of these early experiences in terms of their generalizing effect cannot be overemphasized. A small neighborhood community, providing adequate play space and facilities for the functioning of such primary groups, is particularly conducive to the development of lasting security in the child. As evidence of the maladjustment that may occur when neighborhood primary groups do not function in an organized manner, Perry cites Thrasher's gangs.

Unwittingly perhaps, Perry indicates a real understanding of the importance of "conscience collective" as a means of eliminating anomie. One of the benefits of the neighborhood is that it "brings the local community into relief and enables residents to see it as something apart from the rest of the city, as a distinct entity which has its own peculiar qualities and needs."¹⁰ Such group conscious-

⁸ Clarence Perry, *Housing for the Machine Age* (New York: Russell Sage Foundation, 1939).

⁹ Clarence Perry, *ibid.*, p. 215.

¹⁰ Clarence Perry, *op. cit.*, p. 120.

ness makes possible clear-cut identification with the community, an extremely valuable process for the individual. Identification lends security, prevents isolation, gives the individual a strong feeling of belonging. All of these result in ego support.

Identification with something larger than himself (providing it is not too large and overwhelming) gives the individual a feeling of importance, a feeling that he is more than an atom in a vast impersonal society. Making him part of something larger than himself, the neighborhood unit is sizable enough to provide such positive support through identification; yet it is not so large as to submerge the individual in the anonymity of a stupendous metropolitan community.

Walter Gropius is one of the few planners to recognize the social element as central to the planning concept. Gropius advocates neighborhoods for the express purpose of preventing "social loneliness." His emphasis, like that of Mumford, is to orient cities to the human beings that will inhabit them, rather than to the machines that at present dominate them. One of the original aims of urban living was to make social contacts possible; the end of the new neighborhood should be to recapture that sound principle of the past.

Although not expressly stated, Gropius' idea of the neighborhood is aimed toward elimination of anomie:

"Relations between families, friends, and co-operative teams would have a better chance as creative factors in ordinary living than they now know in the chaotic towns which *isolate the citizen* . . . The reciprocity of influence from individual to individual is as essential for mental development as food is for the body . . . the social life of the people where

they live closest together is thoroughly dis-integrating . . . Left alone in the *city desert* without neighborly contacts, their minds are dulled and their growth stunted."¹¹ (*italics mine*)

The psychological terminology may be absent, but the same idea is clearly uppermost in Gropius' mind.

A considerable number of planners are concerned with the problem of humanizing the city, personalizing urban life, reducing the size of communities—all of which are lay terms for dealing with the basic problem which we have termed anomie. The fact that these writers fail to use technical terminology does not by any means render their contributions on the neighborhood invalid. From a practical view point, they may have achieved more than the technician—by stating the problem in popular terms that can best be understood by the citizens who will be most affected by such a reorganization. However, for purposes of our analysis of the functions of the neighborhood in relation to anomie, it will be best to translate such concepts into more accurate psychological terminology.

Lewis Mumford is one of the best representatives of these planners. He aims to "cut down the size of things and raise their quality up to the human level. A friendly and safe world for children; a neighborhood which encourages free and frequent meetings between residents of a community."¹² Another statement of the same end is provided by Ascher who says explicitly that the city should ". . . not dwarf its inhabitants into anonymity, but provide a stage of sufficiently intimate scale so that the citizen can master it and play his role with satisfaction."¹³ Jose L. Sert also feels that man is lost in the vast extension of our metropolitan areas.

¹¹ Walter Gropius, *Rebuilding Our Communities* (Chicago: Paul Theobald, 1945), p. 53.

¹² Quoted in James Dahir, *The Neighborhood Unit Plan* (New York: Russell Sage Foundation, 1947), p. 40.

¹³ Charles S. Ascher, *Better Cities* (National Resources Planning Board, April 1942), p. 6.

"There is no relationship between their vastness and the human scale."¹⁴

Herry and Pertzoff¹⁵ indicate an excellent understanding of the possible effects of the neighborhood on the anomie of modern urban life. They recognize that the city is no longer "the tightly knit community that existed in Colonial New England. It has become too big, too complex, *too discouragingly impersonal* (emphasis mine). Moreover, its plan makes impossible a resurrection of community feeling"¹⁶ As a result of this state of urban life, man has become a "statistical unit." Herry and Pertzoff came close to an actual statement of anomie as we have defined it: "We are totally incapable as individuals of coping with the overwhelming assault of the myriad issues of daily life in the big city It is impossible to become conscious of one's responsibilities because the number of people is too large to be grasped as an imaginable reality by any mind. Hence the flight from reality, the characteristic of our time."¹⁷ The last remark in particular refers to the serious psychopathic maladjustments that have become so prevalent in modern cities. As an antidote to the problem, Herry and Pertzoff see the neighborhood as a means of breaking the city into social units which have a recognizable individuality and a manageable size.

A number of writers, among them Herry and Pertzoff, and Eliel Saarinen, favor the neighborhood on the grounds that the city is a living organism and must be structured in an organic system. To this end they advocate neighborhoods as cells in the over-all organism. It is not necessary to accept this metaphysical theory of urban organization in order to

accept the end as these writers see it. A more scientific viewpoint would reject the tenuous organism theory as such, but accept the neighborhood on other, more empirical grounds.

The Neighborhood and Anomie

While the social role of the neighborhood may not be prominently stated in the literature, it may nevertheless be gleaned through careful study. A statement of the function of the neighborhood in relation to urban anomie may now be formulated as follows. It should be borne in mind that this formulation is in no way attempting to import the "physical and social amenities of the countryside and small town into the city."¹⁸ It stands on its own merit in meeting the need of a contemporary urban population.

A stable neighborhood environment provides the child with an organized primary group outside the family in which his first contacts with other individuals his own age are made. Psychologists are more and more convinced of the importance of these early contacts on the personality structure of the individual. The community can serve either to confirm or to reject the fundamental values which the child has met within the home. J. S. Plant has pointed out the importance of interaction between the individual and the community. The child first meets this interaction in the neighborhood play group.

A neighborhood play group with ample and safe facilities can function much more effectively for the individual than can a play group on a traditional city street. There is no question but that such elementary groups *do* exist in the gridiron streets of our traditional cities;

¹⁴ Jose Luis Sert, "The Human Scale in City Planning," a symposium edited by Paul Zucker (New York: 1944) p. 395.

¹⁵ Herman Herry and Constantin Pertzoff, "An Organismic Theory of City Planning," *The Architectural Forum*, April, 1944, p. 133-140.

¹⁶ *Ibid.*, p. 133.

¹⁷ *Ibid.*, p. 133.

¹⁸ Reginald R. Isaacs, "The Neighborhood Theory," *Journal of the AIP*, Spring 1948, p. 15.

the relative effectiveness of their functioning, however, is fundamentally hampered by the physical pattern in which they are confined. Halfway solutions, such as superimposing a park in the midst of a grid pattern, will not do the trick as effectively as the neighborhood pattern of organization. For the neighborhood provides for play space and community facilities which are effectively integrated within the total pattern of homes. The neighborhood plan further strengthens the child's primary group by creating a situation which is conducive to the organization of parental supervision of the younger play groups. In short, every element of the neighborhood unit—the green spaces, the organized location of houses, the community facilities, the diversion of traffic—are all highly encouraging to the development of strong primary groups for children.

To a marked extent the neighborhood primary groups can also act to bring adults into group life. In a society which leads to marked isolation of individuals it is supremely important to make citizens a part of an "in-group." Society can control individual behavior only through its own group pressures, for people who are not members of the group do not submit to communal influences. From a much broader point of view, it is necessary to have individuals assume group membership or else the larger society becomes impotent to function. This does not necessarily imply totalitarian control of individual behavior; it does state unequivocally, however, that no society can function unless individuals accept membership in it and submit to its authority on certain basic behavior patterns. Carried to its extreme, lack of group membership on the part of all persons in a society can lead only to anarchy. In between the two poles of anarchy and totalitarianism lies the median of societal

control coupled with individual freedom. Here is where the neighborhood plan can serve to integrate individuals into an intimate primary group—thus bringing them within the bounds of democratic social discipline.

From the viewpoint of the individual as well, identification with a group is of crucial importance. Ego support, in terms of group acceptance and approval, is almost as necessary to the survival of an individual as are food and shelter. Isolated individuals are invariably insecure individuals. For no one person is strong enough to be able to subsist on his own personal approval of himself. Family approval is important, but larger group support can only serve to strengthen the individual. George H. Mead has pointed out that an individual is a personality only *because* he belongs to a community.¹⁹ From the point of view of the planner, the most effective means of providing for meaningful identification lies in the neighborhood unit.

Loyalty to locale appears to be an inevitable outgrowth of any human community. The neighborhood unit, easily identifiable and standing out in relief against the rest of the city, is conducive to open and enthusiastic identification, especially on the part of individuals who come to feel that their happiness and that of their families is closely tied up with the neighborhood.

Such identification is not necessarily conducive to the development of provincialism or localism of the type that would preclude an interest in matters of a community or world-wide concern. Few neighborhood residents would confine their lives exclusively to this area, but would move freely in a community comprised of a group of neighborhood units. Working members of the family would

¹⁹ George H. Mead, *Mind, Self and Society* (Chicago: University of Chicago Press, 1934).

certainly circulate outside the neighborhood, while attractive cultural facilities would draw all residents into the wider community. What is more, branches of national or international organizations could function within the neighborhood, or, if there would not be sufficient interest locally, with residents from a small group of contiguous neighborhood units—thus providing an active interest in outside affairs.

Living in an organized neighborhood unit would be no more conducive to localism than is residence in an unplanned urban area. The absence of small foci of identification does not necessarily lead to positive identification with larger community units. Individuals cannot be "citizens of the world" in any real sense for such status provides for no concrete identification. Even if there were a world government, individuals would have to identify with portions of it—for purposes of their own security. The "world" can provide neither response nor recognition, not approval nor ego support of any kind. Neither can the "working class." Every individual must find for himself a group of such dimensions to give him this type of support. Once having identified in this manner, he can become a highly creative—and less neurotic—citizen of the world. Children in particular cannot identify with large, semi-abstract groups. For purposes of their own security, they must have a small, comprehensible group with which to identify. The evidence of the great metropolitan communities in which anomie is most severe should provide conclusive proof that individuals need, not a larger focus of identification, but a much smaller one.

A physical environment that is too overpowering in its colossal dimensions can serve to dwarf the individual personality into inconsequence. To a large extent this has been the actual effect of

megalopolitan living on many individuals. Consciously or unconsciously, the urban dweller has come to regard himself as small and unimportant and ineffective in a social environment. This attitude has had serious repercussions not only on the democratic process but in terms of psychopathic maladjustments. One important function of the neighborhood unit is to raise the stature of the individual in his own eyes by placing him in an environment which does not overwhelm him by its size. Such an environment can lead only to increased stability, security, and self-assurance on the part of the individual.

It has been claimed by opponents of the neighborhood concept that other mechanisms can eliminate anomie by more effectively providing the individual with the type of identification and security allegedly provided by the neighborhood unit. Among such mechanisms they list various secondary groups and associations such as churches, labor unions, political groups, professional organizations, and special interest groups—most of which are too large to function in one neighborhood exclusively. It is said that individuals have much greater motivation to identify with such groups than with families who happen coincidentally to live contiguous to them.

In response, it must be said that there is no objection to encouraging individuals who would like to identify with groups outside the neighborhood. The problem in an anomic society has been that too many individuals have *not* identified, despite the existence of a multitude of such organizations. From the view point of eliminating anomie, it is highly desirable that individuals identify with more than one group—proving the values of such groups are complementary, or at least not conflicting. "Joining" is one of the most

effective ways of combatting anomie and should be encouraged.

But "joining" of itself does not necessarily make for identification and all of the healthy consequences that go with it. The phenomenon of paper memberships in huge organizations has become more and more prevalent in our society. There is no assurance nor, for that matter, is there any real prospect that organizations will be able to provide for truly *meaningful* identification, in the sense in which we have discussed it, for *all* members of society. The active members may achieve that degree of identification, but the bulk of the people will never be drawn in to the extent where the organization will really be meaningful to them in any positive way.

The neighborhood unit, on the other hand, can act to provide *all* individuals with *basic group identification*. It is in a position to reach all citizens, regardless of their interest in art or music or union work, and consequently it can provide them with a fundamental security and stability that comes with identification. Individuals who wish further to identify with additional secondary groups, should actively be encouraged to do so.

In addition, it is clear that if all individuals were to identify with secondary associations, the latter would grow to such a stupendous size that the desired effect of joining—namely, elimination of anomie—would ipso facto be frustrated. If, on the other hand, such organizations were to break up into small units, there is no reason why they could not function within a neighborhood unit or for a group of neighborhoods.

Fundamentally, the individualism of the American culture is such that it is unlikely that a vast majority of the people would ever actively identify with any organization or labor union to the extent where they would achieve real security

from that identification. Accepting this, it is necessary to provide for a common denominator of security, namely, the neighborhood unit.

In addition to this negative argument, there is another very potent positive one. In the face of increasing specialization of skills and interests it becomes more and more important to provide opportunities for the expression and growth of the *whole* human personality. Identification with special interest groups serves only to intensify that segmentation. The neighborhood, encompassing as it does almost all aspects of life, recreation, education, sexual satisfaction, economic planning, etc., allows for and encourages expression of the total personality. Mingling with neighbors on this level the individual becomes a more integrated personality. Here again the intention is not to advocate abolition of special interest groups; with the positive identification provided by the neighborhood, special interest groups can serve a highly enriching function whereas, without an opportunity for total identification, such special interest groups lead to sectarianism and segmentation of personality.

To say that the size, heterogeneity, mobility, and lack of solidarity of the modern city are such as to prevent the development of neighborhoods²⁰ is to present a circular argument. It is readily admitted that contemporary city life is characterized by many of these features. *That* is precisely the problem. But there is no reason to accept these conditions as inherent and immutable. The modern city developed as it did because of given social and physical conditions. Planners, in carrying out their responsibility to propose changes in these conditions, are in a position to change many of the patterns which are now considered characteristic of city life. It would be a grave error to

²⁰ Reginald R. Isaacs, *op. cit.*, p. 17-18.

assume a separation between physical and social patterns; the relationship of the two is one of dynamic inter-relationship and any change in one produces a definite reaction in the other. The function of the planner is to change, not to accept the status quo.

It is also said by opponents of the neighborhood concept that such an approach to city planning institutionalizes class and racial segregation by creating nuclei of one-class, one-race families.

The problem of class and racial mixture in neighborhoods is a highly complex one and no simple or glib answer will be readily forthcoming. One crucial fact must be made clear however: in determining a pattern of action, the criterion which we have been advocating in this study, namely, satisfactory adjustment and secure personality structure, cannot be the *sole* factor in deciding on the nature of the neighborhood organization. Hand in hand with the criterion of social adjustment must come a fundamental approach to class and race relationships in society. No amount of evidence, for example, on the high degree of personal adjustment in a one-race neighborhood would convince the writer of the desirability of racial isolation in planning. Experimentation in neighborhood organization must be carried on within a positive framework of democratic theory concerning racial equality and class relationships. Of course, on this level the writer would argue along with Kurt Lewin that the most satisfactory personal adjustment *does* take place within a democratic atmosphere of inter-personal relationships.

Although no extensive experimentation has been done on a psychological level to determine comparatively how successful mixed racial neighborhoods have proven, there is some evidence to indicate that the overt, day-to-day relationships have

been satisfactory. On the other hand, such planned mixing has certainly been more successful from a democratic viewpoint than the "natural" ecological segregation of races as it operates in the unplanned urban environment. So that, while we may lack positive, explicit evidence on the effectiveness of racial mixing, there is ample evidence about us in the form of latent and overt aggression ranging all the way to race riots to indicate how unsatisfactory the existing system is from the viewpoint of social adjustment. A hypothesis might be ventured (subject to experimentation, of course) that the social adjustment in a racially mixed development is more satisfactory than in a segregated environment.

In addition, it should be pointed out that the neighborhood unit provides one of the most effective mechanisms for planning *against* class segregation. As a controlled environment, the neighborhood provides planners with an opportunity to experiment fruitfully with mixed classes and races. Extensive study and experimentation are needed before an effective formula providing the answer to this highly complex problem will be available. The neighborhood unit can serve as a laboratory for such experimentation, where controlled experiments of an advanced nature can be carried on.

To a large measure all discussion of neighborhood theory is necessarily academic. So long as planners have not formulated a satisfactory *alternative*, the neighborhood concept must remain the basis of practical planning. Even Reginald Isaacs, with his vociferous objections, is unable to provide any real substitute.

This fact of itself is no justification of the theory. But neither are Isaacs' accounts of the many practical abuses of the neighborhood concept grounds for its

rejection.²¹ Any concept, no matter how valid, is subject to abuse. But, assuming that the concept rests on firm theoretical ground, the practical abuses by FHA and real estate operators are not necessarily inevitable. As has already been pointed out, planned neighborhoods provide one of the few real opportunities for democratic mixing of classes and racial groups. Certainly, the only observable and known alternative, namely, the haphazard development we see all about us, is far worse from the viewpoint of stratification and separation of social groups.

Conclusion

It has been the thesis of this study that the focus of neighborhood theory and practice should be on the adjustment of the individual to an urban environment. A careful survey of the literature has shown that, except in isolated instances, neighborhood theory is largely oriented to physical ends, with social considerations as subsidiary. In cases where this was not true, the social and psychological

processes were discussed in extremely amateurish and utopian terms, indicating little real understanding of the fundamental principles of psychology. An attempt has been made to formulate more accurately the precise function of the neighborhood in the social and psychological adjustment of the individual. Through a process of translating lay terminology into more scientific psychological language, this function has been defined principally as one of providing for adequate identification in an atomized society.

Finally, it should be pointed out that this is by no means a complete study. We have attempted merely to develop an adequate theoretical scheme on the basis of which to justify the neighborhood concept. The entire study represents an extended development of the following hypothesis: the neighborhood unit is conducive to the reduction and ultimate elimination of urban anomie. Whether this hypothesis is fundamentally valid can be seen only by a process of careful experimentation and examination of empirical evidence.

²¹ Reginald R. Isaacs, "The Neighborhood Unit as An Instrument for Segregation," Part II, *Journal of Housing*, August 1948, p. 215-19.

Multiple Fuel Needs of the American Economy†

By WALTER H. VOSKUIL*

EACH year the United States uses fuel equivalent to a billion tons of coal, more or less. Our fuel and power come chiefly from four natural sources—coal, petroleum, natural gas, and water power. Some day oil in shale may become a source of fuel; and nuclear energy may contribute to power supply.

We put fuels to work in many ways. The raw fuels as mined from the ground or, as pumped from wells, are not very useful to industry; most of them have to be specially prepared to do industry's special tasks. We need several types of solid, liquid, and gaseous fuels. We also need electrical power—energy in non-material form. Engines (used as an all-over term) include many types and kinds, such as steam engines (and boilers), internal combustion engines, hydraulic, engines, dynamos, blast furnaces, ovens, retorts, hot blast stoves, etc.

The variety of the natural fuels and the fact that they can do many different jobs has added to the versatility of our economic pattern. The outstanding example of this is the discovery of petroleum and its cheap production in large quantities which laid the basis for the wide use of the automobile, stimulated the development of a large manufacturing industry and a host of related industries that serve the automobile owner, from manufactures to service agencies.

The beginning of our modern industrial economy and its growth rested on several specially prepared fuels that permit of no substitution. The number of specially prepared fuels tends to increase because they do their work with increasing efficiency.

† This article was prepared originally as a paper which was read before the Dial Club, Urbana, Illinois, March 9, 1948.

Fuels in industry may be grouped broadly into two general types: those that supply heat and those that supply power. Within each group the range of requirements is so wide that a correspondingly wide variety of fuels is needed to meet them. Some industries require such specially prepared fuels that it is not possible to use a substitute fuel but other industries can use any one of several fuels. The latter is especially true in the heat-using industries. In the power-using industries the many kinds of engines call for fuels in various specialized forms. Looking at it from the other side, the very fact that we have ample supplies of solid, liquid, and gaseous fuels at low cost provides an opportunity for the development of power-using activities that would be out of the question if our fuel supply were limited to coal alone. In heat operations, there are two processes:

- (1) The smelting of ores—a reduction process that requires heat to raise the ores to a temperature in which the desired reactions take place, and carbon to unite with the oxygen in the ores. This demands a special type of fuel.
- (2) The production of heat to raise process substances to high temperatures. Examples of this are heat treatment of metals, such as the heat treatment of ingots in the soaking pit, heating of billets, sheets, rods, or even in preparation for rolling or drawing. Another group of heat operations includes raising of process steams, heating air for blast furnaces, drying, cooking, boiling, vaporizing, or fusion.

In power-using industries, the motors range from the huge stationary turbines of the power station (fired by coal and driven by steam) to the small mobile in-

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ternal-combustion engine unit of a lawn mower, or a combination of the steam turbine as a prime mover and power transmitted to distant points through the generator to an electric motor, frequently a fraction of a horse power in size.

In these many uses of heat and power by industry, each fuel is selected with two general considerations in mind, technology and relative cost. Technology sets the limit within which one fuel can be substituted for another. Price is the selective mechanism by which one out of several possible fuels is chosen. To the several raw fuels available we apply varying degrees of preparation. These range from simple screening operations to the high degree of preparation represented by the processes of coking coal and refining oil and even to synthesizing fuels from raw materials. With an advancing technology the types of prepared fuels have increased, always with more specialization and exclusiveness of use.

The industrial economy of the United States was founded upon coal. The more recent use of petroleum and natural gas has added versatility to the kinds of productive activities that can make use of power. Because of this wide variety and excellent geographic distribution of fuels it has been possible to carry out processes and to apply power to productive activities which would not be possible if we had access to only one fuel.

In America we have seven areas of economic activity in which fuels and power are used widely: manufacturing, power generation, agriculture, mining, transportation, construction, and domestic heating. Comprehensive data in these fields are meagre except possibly

for manufacturing, transportation, and power generation.

Fuels in Manufacturing

The year 1939 is selected for an analysis of fuels in manufacturing. This year is chosen, partly because the census data let us make a more detailed breakdown and partly because 1939 gives us a peacetime pattern of fuel and energy consumption before it was distorted by World War II. In addition to the detailed data for 1939, data on fuels used in manufacturing for the period 1939-1945 are analyzed to the extent that data are obtainable.

The calculated amount of fuel used by manufacturers in 1939 was 240,585,597 tons; this includes all types of fuels and electric power converted into coal equivalent according to the ratio shown in Table I. The first question is, how much of this fuel represents special fuels (for which there is no substitute) and how much represents competing fuels. The census lists more than 200 manufacturing industries. The largest single user of fuel is the iron and steel industry.¹ This industry has two phases: (a) the reduction of iron ore to pig iron; and (b) the preparation of steel in ingot form and later in semi-finished steel shapes. The Census, however, reports only the total for the entire industry, so the analysis is made accordingly. In 1939 the blast furnaces and steel works used about 30 percent of all fuels used in manufacturing industries.

Analysis of Table II. Fuels used in blast furnaces and steel works, as itemized by the Census for the year 1939, are shown in Table II. Column two shows the quantities of fuel used, and column three states the liquid and gaseous fuels and purchased electricity of coal equivalent.

In computing the total amount of fuels used in the blast furnace and steel industries in terms of coal equivalent the following ratios are used: coke is given a

¹ Although the Census lists the oven-coke industry as the greatest consumer of fuel, this is a fuel-preparation industry, transforming coal into coke accompanied by the separation of gas and tar from the raw coal. These latter products, with coke, are used as fuels in steel industries and are calculated in the fuel consumption of the strictly fuel-using industries.

TABLE I—FUELS USED IN MANUFACTURING: 1939*

FUEL	Quantity	Percent	Quantity, Coal Equivalent, Tons
Bituminous Coal.....	.....	.....	137,771,432
Anthracite.....	.....	59.3	5,015,857 (35,115,357) ¹
Fuel Oil, Bbls.....	133,773,524	13.7	33,050,000 ²
Gas, Natural, Mcf.....	886,806,520	14.8	35,472,260 ³
Gas, Manufactured, Mcf.....	1,283,749,085	.....	(65,000,000) ^{1,4}
Gas, Mixed.....	24,536,718	.....	(500,000) ^{1,4}
Purchased Electric Power, m. kw. hrs.....	45,040,075	12.2	29,276,046 ⁵
Total, Less Coke, Mfg. Gas, Mixed Gas.....	.....	100.0	240,585,595

* Source: U. S. Census.

¹ Figures in parentheses not included in the total.² Conversion factor: 170 gallons equals one ton of coal.³ Conversion factor: 25,000 cubic feet of gas equals one ton of coal.

⁴ Conversion factor: The conversion factor for manufactured gas presented some unusual difficulties by reason of the several sources and varying b.t.u. values of this type of gas. For the manufacturing industries in general and the iron and steel industry in particular gas is obtained both from the by-product coke oven and from the blast furnace. The latter has a b.t.u. value somewhat less than 100. For the aggregate of manufactured gases, an arbitrary figure of 250 b.t.u.'s. per cubic foot has been assigned.

⁵ Conversion factor: 1 kw. hr. equals 1.3 lbs. of coal.

value equal to coal; 4 barrels of fuel oil are equal to a ton of coal; 25,000 cubic feet of natural gas are equal to a ton of coal; 100,000 cubic feet of coke-oven gas are equal to a ton of coal, and one cubic

foot of blast furnace gas is assigned a value of 100 b. t. u. This item is not included in the total in column three because it is a product of the coke in the blast furnace and its fuel value has,

TABLE II—FUELS USED IN THE BLAST FURNACES AND STEEL INDUSTRY: 1939*

FUELS	As Reported by the Census	Converted Into Fuel Equivalent	Fuel by Original Source
		(Tons)	(Tons Equivalent)
Anthracite Tons.....	342,945	342,945	342,945
Bituminous Coal, Tons.....	9,227,872	9,227,872	9,227,872
Coke, Tons.....	32,092,930	32,092,930	45,874,043
Fuel, Oil, Bbls.....	27,387,058	6,846,764	6,846,764
Natural Gas, mcf.....	102,032,341	4,080,000	4,080,000
Manufactured Gas.....	1,025,093,492	.....	.....
Coke Oven Gas, mcf.....	237,820,694	4,957,814	.....
Other Gases.....	787,202,898	3,000,000	.....
Mixed, mcf.....	6,431,604	128,600	.....
Electricity, kw. hrs.			
Generated in Plant.....	5,680,082,722	.....	.....
Purchased.....	5,116,980,842	.....	.....
Sold.....	1,349,587,089	.....	.....
Net Purchased.....	3,767,393,753	2,448,806	2,448,806
Net Used.....	9,447,476,475	.....	.....
		59,925,731	68,820,430

* Source: U. S. Census, *Manufacturers*, Vol. 1.

therefore, been included in the coke. Electric power is converted into coal equivalent at a ratio of 1.3 pounds of coal per kilowatt hour. Only the coal equivalent of purchased electrical energy less energy sold is included in the table. It is assumed that electrical energy "generated in plant" is produced from fuels listed in column three.

Column four shows total fuels used, computed by adding original fuels plus the coal equivalents of the coke (col. three) charged into ovens to make the required 32 million tons of coke. If the average coke recovery is 70 percent, the coal requirement is calculated to be 45,874,043 tons. This column further assumes that manufactured gases used in steel manufacture are derived from the coal processed in the coke ovens. There is a discrepancy between the totals of columns three and four; this discrepancy can be partly removed by deducting the coal equivalent of coke oven gas that is produced but not used in steel and affiliated works. In 1939 this amounted to 437,000,000 cubic feet of which three-fourths or 327,000,000 is chargeable to coal processed into coke for metallurgical purposes. The coal equivalent of 327,000,000 cubic feet—6,540,000 tons—if deducted from the total of 45,874,043 in column four leaves a net total of 39,334,043 tons, a reasonably close approximation to the total in column four.

The fuels used in the manufacture of iron and steel are drawn from all sources of natural fuels and perform both heat and power operations, but the crucial operation is the reduction of iron ore to the metal. This operation requires a fuel that supplies heat and also serves as a reducing agent. The iron and steel industry is distinctive in the exacting requirements of the blast furnace fuel and the interrelationships between the blast furnace fuel, its by-product fuels, and the

later operations in the steel industry. Although the reducing agent in the furnace is carbon monoxide, the fuel used is carbon in the form of coke. The fuel used in the blast furnace must supply the basis for the reducing agent, must also be strong enough to hold the heavy weight of the furnace burden, and must be porous enough to burn quickly. The hard porous devolatilized coke (product of the destructive distillation of coal) is for all practical purposes the only suitable fuel. Other methods of reducing iron ore have been proposed but the blast furnace method of using coke as fuel is so much more economical that it has no rivals. This is important because it is our only means of obtaining iron cheaply.

The second distinctive characteristic of the pig iron and steel-making industry is the interrelationship of coke-oven by-products fuel, that is, gas and tar. The production of ingot steel and subsequent semi-finished shapes demand heat—for instance the soaking pit—open-hearth reverberatory furnace, or reheating of blooms or billets for rolling or forging. For these operations gas (natural, coke-oven, producer), pulverized coal, fuel oil, or tar can be used; but gas is often preferred. Both natural gas and manufactured gas are available to the steel industry and both are used. The nearness of by-products coke oven to steel plants accounts for the fact that this industry is a major outlet for by-product gaseous fuel; it uses 10 percent of the total. In fact, coal or the derivatives of coal account for 80 percent of the fuels used in iron and steel manufacture.

The amount of fuels used in blast furnaces and steel works between 1939 and 1945 increased substantially but this indicates no significant change in the pattern of fuel use. Coke as the agent in iron ore reduction is unchallenged. Technology has found no substitute, although

TABLE III—FUELS USED IN THE STEEL INDUSTRY: 1939-1945*

Year	Coal Used	Metallurgical Coke Used	Coke Oven Used in Heating Ovens	Gas Used in Steel and Affiliated Plants	Tar	KW Hrs. ¹
	<i>thousands</i>		<i>million c. f.</i>	<i>million c. f.</i>	<i>000 gallons</i>	<i>millions</i>
1939.....	9,808	31,498	232,864	237,891	85,364	12,245
1940.....	10,040	42,483	297,566	305,590	112,738	14,809
1941.....	10,902	50,454	328,137	330,452	136,091	18,703
1942.....	10,434	55,492	344,412	335,291	98,387	20,316
1943.....	11,238	57,690	350,763	345,419	85,229	22,364
1944.....	10,734	57,481	373,024	384,933	156,736	23,290
1945.....	10,084	51,003	337,128	324,292	107,219	21,702
1946.....	8,603	.....	.....	.....	.....	19,406

* Source: U. S. Bureau of Mines, *Minerals Yearbook*, Chapters on "Coal" and "Coke."

¹ The exceptional trend in electric power consumption is discussed subsequently.

research workers have tried to develop supplementary means of ore reduction, if not alternative methods.² The by-product gases of the coke oven and blast furnaces (because of the conditions under which they are produced) are not in the competitive fuel market, nor do they meet competition from other fuel sources. Technologically these fuels could be replaced by competing fuels.

The trend in the uses of supplementary fuels, for which data are available in the iron and steel industries in the period subsequent to 1939, is shown in quantities and by index numbers in Table III.

The iron and steel industry has another distinctive characteristic in the large tonnages of raw ore and raw fuel that must be moved and treated before the free metal is obtained. This restricts iron production to districts where these bulk materials—coal for coke making, iron ore, and limestone—can be assembled at a minimum cost, and it also restricts the iron production districts to the neighborhood of coal resources from which coke can be made.

Manufacturing Other Than Iron and Steel

The manufacturing industries other than iron and steel (with certain special-

² See sponge iron studies.

ized exceptions) show no particular fuel preference based upon technological problems. The quantities of fuel consumed in these remaining manufactures in 1939 are indicated in Table IV.

TABLE IV—FUELS USED IN GENERAL MANUFACTURE*

FUELS	Total	Exclusive of Iron Steel, and Oven Coke Industries
Anthracite, tons.....	5,015,857	4,672,912
Bituminous coal, tons	137,774,432	67,079,920
Coke, tons.....	(35,115,357)	(3,022,427)
Fuel Oil, Bbls.....	133,773,524	106,386,466
Natural Gas, mct....	886,808,520	784,776,179
Mfg'd Gas, mct....	(1,283,749,085)	(219,135,102)

* Figures in parentheses in this table are manufactured products of bituminous coal and are not to be added in totals of all fuels used.

The industries in which special fuel requirements prevail or where certain preferences appear to exist are petroleum refining, carbon black, pulp and paper mills, primary smelting and refining of non-ferrous metals, and bread and other bakery products. Petroleum refining is a large user of fuels, most of which are obtained from the raw material processed or associated materials, such as natural gas.

Natural gas is used exclusively in the manufacture of bone black, carbon black, and lamp black—exceptions are insignifi-

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cant. The requirements of a cheap gaseous hydrocarbon are met only in the surplus gas supplies in certain portions of the Midcontinent and gulf coast oil fields.³

Pulp and paper mills and primary smelting and refining of non-ferrous metals all show a high preference for anthracite; fuel oils and natural gas do also.

Electricity in Manufacturing

Electricity as a form of power is so unique that it deserves special consideration. It contributes to human comfort in the many home chores that can be done by small motor-driven machines, and here it has a convenience value that is out of proportion to its quantitative power output. It is the accepted source of light in the home, office, factory, on the street and, to an increasing extent, on the farm. It is practically indispensable for certain types of transportation services in cities, although this represents only a small part of the total electrical power output. Most important, quantitatively, is its use by the manufacturing industries.

In the manufacturing industries electric power contributed the equivalent of about 22 percent of the fuels used. This unusually high proportion arises from the ease with which electric power can be applied to the productive processes.

One of the important contributions of electric power lies in the fact that it can be divided into extremely small power units and also that power units can be scattered anywhere throughout the plant. These special advantages are restricted chiefly to a unit such as a factory building or manufacturing plant. These are limited by the practical distance that power can be supplied from a central

source by means of conducting cables or wires. It does not fit the power needs on a farm, on the highway, on the railroad (with exceptions), or in the construction industries, where mobile self-contained power units are needed.

Electrical power in manufacturing industries has four major uses: lighting, 7.80 percent; motors, 62.08 percent; electrolytic cells, 13.97 percent; and electric furnaces, 13.73 percent. The percentages show the distribution of use in 1945.

During the period from 1939 to 1946 the use of electric power in manufacturing increased somewhat more rapidly than did the use of other forms of fuel. An analysis of electrical power consumption, by industry groups, for this period shows that the largest increases were in the chemical group, iron and steel, non-ferrous metals, petroleum and coal, transportation equipment, machinery, electrical machinery, and rubber. Because these were mostly during war years, certain increases can be related to this factor. The increase in iron and steel was enhanced, no doubt, by a rise of electric steel output from an index of 100 in 1939 to 445 in 1943; total steel in this same period advanced from 100 to 169.

One of the outstanding increases in electric power use since 1939 was in the manufacture of aluminum. Electric power consumption rose from an estimated 3.2 billion kilowatt hours in 1939 to an estimated 18.4 billion kilowatt hours in 1943, the peak year of aluminum output. The total rate of increase of electric power in the non-ferrous industries (exclusive of that used in aluminum reduction) is shown in Table V.

Electric power used in magnesium production, although the total was no doubt large, was difficult to estimate; during the war, magnesium metal was

³In the manufacture of carbon black the fuel has an unusual function. As it burns a portion of the carbon contained in the hydrocarbon gases is dissociated and forms a deposit of carbon black.

produced by several methods, in one of which electricity is not important.

A third element in the increase in the use of electric power in manufacturing is in electro-chemical processes used by the chemical industries. The chemical group, in 1945, used about 50 percent of the total for manufacturing industries. Of this, 28 percent was used in electric furnace work and 22 percent in electrolytic cells. Other industries that showed large increases of electric power use and that also used much electricity for furnace work were machinery, electrical machinery, and transportation equipment. How much of this increase in electric power use was a temporary result of war activity will be clear after a year or two.

The use of electricity in manufacturing may increase somewhat in the future with the expansion of electric furnace production of fine steels in the non-ferrous metal industry especially in the use of electrolytic processes. It will probably not cause revolutionary changes in the manufacturing industries themselves nor affect the use of any of the fuels. The use of electricity has had the effect of adding one more source of power, that is, water

power; this form of energy is not very useful except as it can be transformed into electric power.

Fuels in Transportation

In some of the transportation services only special fuels can be used; in others several fuels can compete. Particular interest centers first upon railroad transportation; here the coal-fired steam engine has been almost the exclusive motive power but alternative power units and alternative fuels are becoming significant. Second, interest focuses upon automotive transportation; its extensive development is influencing the pattern of power use and development far beyond the operation of automobiles itself.

The importance of transportation in America is evidenced in the large portion of the total energy used by this part of the economy. Coal used as fuel in railway transportation varies from one-fifth to one-fourth of the total coal output, and oil used in transportation services is somewhat more than half of the quantity of crude oil produced.

This large use of fuels in transportation services arises from three characteristics of the American economy: (1) the large

TABLE V—CALCULATED ELECTRIC POWER CONSUMPTION IN ALUMINUM MANUFACTURE: 1939-1946

Year	Aluminum ¹ Production Tons	Electric Power Required Kw. Hrs. ²	Total Electricity Used in Non-ferrous Industries Kw. Hrs.	Electrical Power Used in Non-ferrous Industries Exclusive of Aluminum
	<i>thousands</i>	<i>millions</i>	<i>millions</i>	<i>Kw. Hrs. in Millions</i>
1939...	164	3,271	5,953	2,683
1940...	206	4,126	7,805	3,679
1941...	309	6,181	10,663	4,482
1942...	521	10,422	15,375	4,953
1943...	920	18,404	23,496	5,092
1944...	776	15,529	20,755	5,226
1945...	496	9,930	14,912	4,982
1946...	407	8,139	11,811	3,673

¹ U. S. Bureau of Mines, *Mineral Yearbook*.

² Calculated at a rate of 10 kw. hrs. per pound of metal.

area over which raw materials must be assembled and goods distributed; (2) the large tonnages of raw materials that are needed to maintain present levels of production in America; and (3) the unique development of passenger automobile transportation.

Railroad Fuel

Railroad fuel is an important factor in the coal industry in the United States. The size of the nation and the long hauls between sources of raw materials and manufacturing centers are reflected in the large amount of fuel used by railroads. There is a marked contrast between the railroad fuel needs of European industrial nations and the United States. In 1937 (a prewar year of moderate business activity) Germany used 15.5 million tons of coal for railroad transportation; England used 13.3 million tons; and the United States used 82.7 million tons of railroad coal and about 16 million tons equivalent of fuel oil.

Examining the railroad fuel use in the United States in more detail we note that during the war period 1940 to 1946 there was an increase in railroad fuel consumption, with a somewhat more rapid growth of use of liquid fuels than of coal.

The significant change in liquid fuel used by railroads is the rapid growth in the use of diesel fuel. Although its contribution to the total railroad requirement is small, the growth since 1940 has been very rapid. In 1940, 797 diesel locomotives were in service on the railroads and they used 62 million gallons of diesel fuel. By 1947 the number of diesels had arisen to 4089 and the diesel fuel consumption reached a total of 736 million gallons. In the meantime steam locomotives in service were reduced from 40,041 in 1940 to 35,258 in 1947.

A builder of diesel electric locomotives recently predicted that at the present rate

of installation, at least 20 percent of the total horsepower will be in diesels by the end of the first postwar decade, and this 20 percent will be performing 40 percent of the total rail hauling and switching. Eventual complete diesel-equipped railroads is the goal of the industry.

The questions that are posed by such a program are: first, how much diesel fuel will be required to replace the 100,000,000 tons of coal, more or less, used by the railroads at present; and second, what will happen to the price of diesel fuel? On the question of coal displacement of diesel fuel, these data are offered by the I.C.C.:

*"On the basis of the average rate of coal consumption by coal-burning locomotives in each of the three services (switching, freight, and passenger service) diesel-electric locomotives displaced over 14,136,625 tons of coal in the first eight months of 1946."*⁴

During this same period diesel locomotives used 328,416,469 gallons of fuel, or the equivalent of one gallon of diesel fuel for 86 pounds of coal. On this basis the 2,340,000,000 gallons or 55,000,000 barrels of diesel fuel would have replaced the 100,620,000 tons of coal used by railroads in 1946.

Costs. An analysis of fuel costs in the first eight months of 1946 gives an interesting comparison of diesel fuel and coal costs. If 328,416,469 gallons of fuel oil displaced 14,136,625 tons of coal at a cost of \$3.75 for a ton of railroad coal and 5.49 cents per gallon of diesel fuel (the figures of cost given in this same report) then \$18,030,064.15 (oil costs) did the work of \$52,729,611.25 (coal costs), a ratio of 0.34 to 1.

This comparison of fuel costs is not conclusive, although the available data point in that direction. Fuel costs are

⁴Bureau of Transport Economics and Statistics, Interstate Commerce Commission, *Monthly Comment on Transportation Statistics*, Nov. 13, 1946, p. 4-5.

subject to change through changing efficiencies as well as changes in price. In the meantime the trend of locomotive purchases by railroads is toward diesel locomotives, indicating that the total overall cost of railway motive power apparently favors this type of engine.⁵

Automotive Fuels

The development of transportation by automobile may prove one of the most significant stimuli in the technology of fuel preparation and toward widening the use of power to other economic activities.

Automobile transportation uses currently (as of 1946) 600,000,000 barrels of motor fuel. This is divided among major consumer groups as follows:⁶

Passenger cars and buses . . .	443,000,000 bbls.
Trucks	135,000,000 bbls.
Non-highway use	77,000,000 bbls.

In the non-highway use there appear such users as railroad auto cars, farm industrial tractors, farm engines, internal combustion engines in manufacturing establishments and in several aspects of the construction industry. The major use since the turn of the century is in automotive passenger car transportation. The effect of the extensive use of automobiles upon the pattern of economic productivity in the United States has markedly shaped the pattern and extent of productive effort in a wide variety of activities. The pattern of urban and suburban development has been affected in no small measure by the use of the automobile as a vehicle for local transportation.

Although liquid fuel is associated primarily with the automobile habit of the American people, it is also associated

with the rise and many-sided development of the internal combustion engine, a factor of far-reaching consequences. The internal combustion engine was practically developed in 1860 and the modified Otto engine was invented in 1876, but the period of rapid expansion in the use of this engine did not come until the automobile industry began when the first car was built in 1892. The petroleum industry, which was then and still is practically the sole source of motor fuel (gasoline), had been in existence since Colonel Drake opened the first well at Titusville, Pennsylvania, in 1859. However, the petroleum industry grew slowly until the automobile manufacture began to expand rapidly. Before the era of the automobile the principal refined product of crude oil was kerosene, not gasoline. It would not be correct to say that the existence of an abundant low-cost motor fuel stimulated the invention of the automobile and its later production, but it is correct to state that only the rapid expansion of this cheap and abundant fuel made it possible for the automobile registrations to rise from 8,000 in 1900 to 29,418,000 in 1941. And even this could not have happened if refining techniques had not kept pace with demand and had increased the motor fuel recovery from 18 percent of the crude to 45 percent.

The eight-fold increase in consumption from 1918 to 1946—a period of less than 30 years—was made possible only by cracking of heavier stocks, so that now the composite finished motor fuel contains slightly more than 50 percent of cracked components. Considering further the use of cracked stocks for motor fuels, the war brought about a substantial development of catalytic cracking to sup-

⁵ Reference should be made to a new type of locomotive, the coal-fired gas turbine, now under development. This type of locomotive is designed to use powdered coal as a fuel and is intended to preserve the railroad fuel market for coal. The advantage claimed for this type of locomotive over the diesel is its ability to burn low-cost coal. Although the

thermal efficiency of the diesel is said to be higher, the cost of fuel for the gas turbine will be about one-third that of a diesel and one-third to one-fourth that of a modern steam locomotive.

⁶ U. S. Bureau of Mines, *Minerals Yearbook*.

plement the light products produced by thermal cracking.

The growth of the automobile manufacturing industry was accompanied by significant changes in power and fuel developments in other segments of the industrial economy. The first is the trend toward the use of the internal combustion engine, including the diesel type, as a prime mover in industry. The displacement of steam by diesel-electric locomotives on railroads, in local electric power plants, on ocean vessels, and in transport trucks on highways, is evidence of this trend. This type of engine also began to transform agriculture into a mechanical industry, a process still under way.

The trend toward the use of internal combustion engines accelerated the search for sources of liquid fuel from sources other than petroleum, due to apprehension over the possible decline of petroleum discovery and supply. Without doubt the costly investigations on the liquefaction of coal through hydrogenation, or gasification and synthesis, and on the extraction of oil from shale, are being undertaken only because the advantages of the internal combustion engine over steam are such as to justify this type of fuel preparation rather than to run the risk of giving up many of these useful forms of power.

A third consequence of the use of liquid fuels is the extensive development of a highly specialized form of transportation and communication—the airplane. In this development is involved a new relationship in international affairs, the consequences of which we cannot foresee.

Finally, the development of processes for the manufacture of liquid fuel from several sources other than petroleum may point the way to supply power in areas now technologically backward and where large steam or hydro-electric power plants may not be immediately feasible.

Fuels in Agriculture

Agriculture in the last one, two, or three decades has been jolted sharply by reason of mechanization. In these decades work animals on farms declined from 6,676,704 in 1920 to 3,637,885 in 1940, and 2,800,000 in 1945. This released 14,000,000 acres of farm land more or less hitherto set aside for animal forage. The key factor in the farm mechanization is the tractor, but this is only part of the story. The replacement of the horse by the tractor has also resulted in the gradual redesign of farm machinery to be adapted to tractor use, and power now performs an additional number of farm operations to which animal power could not be applied in a practical manner. Also, it resulted in fewer workers on farms and larger average farms.

Production per farm worker had doubled since 1910, as a result of mechanization and the use of power. Mechanical power in its earliest stages was best adapted to large farms and, as a result, the large farm gained in efficiency much faster than did the small ones. Machines are now being developed for small farms as well, and these farms may be expected to make more rapid strides toward increased output per worker.

The fuel needs of agriculture include fuel for home heating, fuels for self-propelled mobile power units, portable or stationary engines, and electrical energy for power and light in the home and on the farmstead. Mobile power equipment consists of automobiles, motor trucks, tractor and portable gasoline engines. Coal-burning steam engines are rare and declining in number. Agriculture is being mechanized with the aid of power machinery fueled by gasoline, kerosene, or diesel oil.

The most important machine in increasing the productivity of the farms and reducing the man-hour needs is the

tractor. The tractor brings more draw-bar power to particular operations, and thus makes it possible to use larger and more effective equipment at a higher speed than is feasible with horses. Belt pulleys on tractors provide mobile power for work otherwise done with a stationary engine. The power take-off, a substitute for the belt pulley in some work, increases the efficiency and dependability of harvesting equipment like mowers, binders, small combined harvester-threshers, corn pulleys, and field ensilage cutters.

From the heavy cumbersome tractor, limited to draft work and certain belt operations, the trend has been to lighter higher-speed tractors adapted to various uses. Further modifications in tractor design are expected.

Advances in power machines and their application to farm operations is operated in three general directions:

- (1) Design and production of new machines for work in crops where full mechanization or most economical mechanization has not yet been achieved. Three machines, recently developed by a leading manufacturer, illustrate these: the automatic one-man pickup hay-bailer, the mechanical cotton picker, and the mechanical beet harvester.
- (2) Small tractors and tools for the smaller farms. An overwhelming proportion of the farms still without mechanization are the small farms where mechanization heretofore has not been thought to be economical.
- (3) The adaptation of present or modified machines to new uses on farms. One such use is the adaptation of farm tractors and machines to soil-conservation work, particularly terracing. Others are post-hole digging and tree-planting. Tractor-operated loading is another. The widespread adoption of the general-purpose tractor is a great stimulus to farm mechanization. As the tractor has been designed and built in sizes to fit the needs of more and more farms, scores of farm machines specifically designed for tractor power instead of animal power have come into use.

Data on the amount of fuels used in developing mechanical power on farms

are somewhat meagre. The Public Roads Administration gives an estimate of 25,000,000 barrels used in 1945.⁷ This is exclusive of oil fuels used in automobiles and motor trucks on farms, some of which are directly associated with farm operations.

Rural electrification has made rapid strides in recent years. The contribution of electrical energy to mechanization of the farm is limited to such functions as operating milking machines, pumping water, irrigation, and electrical appliances in the home. The amount of electricity used on farms is approximately 4.5 million kilowatt hours.

Fuels in Construction

The varied activities grouped under the general term of construction are probably the least "mechanized," speaking either in terms of installed horsepower per worker, or in the amount and tonages of material handled mechanically instead of by hand labor. Among the construction tasks that lend themselves most readily to use of power are excavating, haulage of materials, moving of earth, grading, hoisting, concrete mixing, etc. The power equipment adaptable to such tasks are bulldozers, tractors equipped with shovels, post-hole augers, trenching machines, or portable engines operating air-compressors, cement mixers, hoists, etc. A large number of trucks, usually classified as transportation equipment, are used only in hauling sand, gravel or stone from quarry or railroad siding to the construction job and are in fact power units used in the building industry. The dominant form of power unit, whether large or small, self-propelled or portable-stationary, is the internal combustion engine. There are no estimates of the fuel used in construction ac-

⁷ Public Roads Administration, Federal Works Agency, *Highway Statistics, 1945*, p. 6.

tivities and the amount can be estimated only by difference after all other uses have been accounted for. The quantity of fuel used apparently is not large, yet power equipment now plays a necessary role in construction and on that basis liquid fuel supply is a necessity.

Fuels in Mining

Fuel and power requirements for mining and quarrying are in a class by themselves. Trucks, bulldozers, tractors equipped with attachments for various specialized operations, pumping engines, compressor units powered by internal combustion engines, all require a liquid or gaseous fuel for operation.

Hoisting and underground haulage in coal and metal mines is usually done with electric power generated in a mine plant central station. In some places, storage-battery power is used as an alternative to line power. Convenient source of supply is the governing factor in selecting fuel for mine and quarry power plants.

Fuels for Domestic Heating

The fuel needs for domestic heating and other retail outlets, such as small business establishments, total from 112 to 185 million tons of coal or its equivalent in a year. Coal (anthracite and bituminous), fuel oil, and natural gas are the principal fuels; wood is also used as a fuel in rural districts as well as in urban centers in some of our western states. The entry of oil and natural gas in appreciable quantities in the market is of relatively recent date and currently contributes about 30 percent of the total.

Fuel preferences shown by geographical areas reflect the local abundance (and cost) of one type of fuel as compared with another. The desire for convenience of handling, cleanliness, etc., has also influenced the selection of fuels for domestic use, although possibly not in the same

degree as has the element of cost. This desire is reflected in the increase in use of fuel oil and natural gas over the rate of growth in use of coal. Preparation and screening of raw coal and the development of mechanical stokers are attempts upon the part of the coal industry to meet the challenge of oil and gas.

The domestic market shows no exclusive preference for any one fuel type but there may be localities here and there where choice is limited for practical purposes to one fuel.

Summary

A review of our fuel and power supply, its nature and characteristics, shows that we need a high degree of fuel preparation and specialization and many types of power machines to enable our economy to function. Almost every consumer good or intermediate product that we wish to name requires somewhere in the production process the services of a blast furnace, an electric motor, a locomotive, an internal combustion engine, a tractive unit, each varying in size and fuel requirements. We use fuels in liquid, solid, and gaseous forms and non-material forces (electricity); we use fuels from the highly-prepared coke or gasoline to run-of-mine coal to power our many types of engines.

Moreover, the sum total of all productive activities, to carry the process to the final stage of a consumer good, requires the correlative use of several forms of power equipment and fuels. The activity, for instance, which sets in motion a demand for electrical power also sets in motion a demand for several kinds of transportation units and their particular types of fuel.

A characteristic of an expanding and evolving industrial economy is the increase in the exacting requirements of materials and fuels that are essential to the productive processes. From a few

materials or types of prepared fuels and power, an industrial economy constantly becomes more and more exclusive in its material requirements; otherwise it would stagnate and wither. High productivity results from power application, from a continual widening of the realm of power application, and from an increasing efficiency of power use. This results in a multiplicity of power and fuel forms and in specialization that leads to exclusiveness of fuel forms for an increasing number of power appliances developed by an enlarging and evolving technology.

Although there is considerable flexibility in choice of fuel for manufacturing, power production, transportation, and domestic and retail use, there are, nevertheless, certain industries or industry groups which are exclusive in their fuel requirements. The distribution of fuels, by type and quantity for principal users, is shown in Table VI. Liquid and gaseous fuels have been converted to their

approximate coal equivalent. Hydroelectric power has been equated on a basis of 1.3 pounds of coal per kilowatt hour.

An inspection of the table reveals some interesting and significant characteristics of fuel use in the United States. Liquid fuels have practically removed coal from the colliery and bunker fuel markets. Only a small part of the total fuels used is converted into electrical power, and the coal equivalent of water power in the production of electricity is small.

In land transportation the item of current interest is the recently developed competition between the fuel-oiled diesel locomotive and the coal-fired steam locomotive. Approximately 100 million tons of coal is at stake in this competitive battle. The large portion of coal used in the manufacture of coke indicates the importance of fuels in the reduction of iron and other metals from the natural ores.

In perspective, three characteristics of

TABLE VI—FUELS USED IN PRINCIPAL GROUPS OF USERS: 1944*

	Bituminous Coal	Anthracite	Liquid Fuels	Natural Gas	Hydroelec- tric Power Coal Equiv- alent
	000 Tons	000 Tons	000 Bbls.	Million c. f.	000 Tons
Collier Fuel and Bunker Fuel.	4,271	.....	105,256	.....	.....
Electric Power Utilities.....	78,887	3,427	40,313	360,000	48,000
Land Transportation, Rail- roads, Motor Cars, Trac- tors.....	132,049	1,094	710,769	.....	.....
Coke Ovens and Gas Retorts	106,841	.....	.....	.....	.....
Manufacturing.....	136,987	5,000	103,617	1,702,000	.....
Domestic and Retail.....	132,795	51,885	158,822	782,930	.....
Military Needs.....	(a)	(a)	144,226	(a)	.....
Used at Mines or Oil Fields..	6,066	.....	56,394	855,000	.....
TOTAL.....	604,442	61,406	1,319,347	3,699,930	.....
TOTAL AS APPROXIMATE COAL EQUIVALENT.....	.....	61,406	329,837	148,000	48,000

* Source: *Minerals Yearbook*.

a Not available.

the fuel supply emerge as distinctive. They are: (1) The large requirements of a specially prepared fuel for the smelting of iron ore to the free metal. The fact that this crucial operation in an industrial economy—the production and supply of free iron—is altogether dependent upon one fuel form, carefully prepared and available only from a limited portion of the coal resources, focuses attention upon the question of adequacy of supply. The problem of coke supply is, in reality, the problem of iron supply, because coke is prepared specifically for the reduction of iron ore and outside of this function coke has very few functions that cannot be performed by some other less elaborately prepared fuel.

(2) The high preparation and the wide range of fuel requirements in the transportation industry. Almost 25 percent of the coal output and 50-55 percent of the crude petroleum output are so used.

(3) The increasing importance of liquid fuels in the modern productive

economy. From a coal-oil substitute for candles to oil lamps in lighting houses, liquid fuels have taken on one function after another, and in some cases have been the deciding factor in the mechanization of entire industries. The fear of a shortage has cast a shadow on the uses of oil; the threat of short supplies has been mitigated to some extent by adding coal and natural gas to the raw materials from which liquid fuel can be obtained.

Liquid fuels are essential to mechanized agriculture and construction and they add versatility to transportation. Agriculture has been transformed in a large degree from animal power to mechanical power, with accompanying increase in productivity, by the use of the internal combustion engine. Until liquid fuel became generally available this addition to agricultural productivity was severely restricted. Gasoline and diesel fuel have applied power in agriculture and transportation in the same way that electric power and the electric motor have applied power in manufacturing.

Interest Rates and Fair Return†

By M. A. ADELMAN*

BASIC to any consideration of the prices charged by a railroad or other public utility are the revenues which accrue to the operating corporation and the resulting rate of return. In this country judicial decisions have laid down the broad principles for ascertaining both the capital invested and the proper yield from it. As these principles are modified or abandoned old problems in determining bases and rates gradually sink from view and are replaced by new ones. Such a change is now in process. Recent court actions have displaced the long dominant theory of "fair return on fair value" with the doctrine that rates of return should be commensurate with returns on other investments of corresponding risk. Our purpose is to summarize briefly the new doctrine, point out some of the problems it raises and some of the factual background needed to operate it.

I

In 1877 the Supreme Court affirmed the power of public agencies to regulate the prices charged by a business which was (in a now classic phrase) "affected with a public interest."¹ The doctrine was soon established that such prices were to be "reasonable;" they were not to be fixed so low as to afford less than a fair return on the value of the investment in the business. The growth of the railroads for some time afterwards, and the later emergence of the electric, gas, and

telephone empires, greatly multiplied the task of regulation without supplying any workable rule or yardstick by which the return on any given investment could be called reasonable or unreasonable.

The difficulty was not technical but basic. The actual value of any property is inseparable from the profits expected; in fact it is simply the sum of the present values of all the future profits. Whatever may be the proper ratio between (a) total value and (b) annual profit—i.e., the rate of return—this ratio can never be altered in the slightest degree by any change in either one. The higher the earnings, the higher the value, and in exactly the same proportion; the ratio is unchanged. Therefore the rate of return can no more become excessively high (or low) than a man can escape his shadow. It follows that when a commission reduces profits by lowering the price of the utility's services, it necessarily reduces the value of the investment in the company, and thus deprives its owners of part of their property. On the ground that this is confiscation without due process of law, regulatory action can be—and often has been—resisted in the courts.²

The rule of "fair return on fair value" was officially valid until January 1944.³ But the decision in *Federal Power Commission v. Hope Natural Gas Company*,⁴ written by Justice (and former SEC chairman) Douglas, completely repudiated it. "Fair value is the end product of the process of rate-making not the starting point . . .

† The writer gratefully acknowledges the aid of Susan S. Burr, of the Division of Research and Statistics of the Federal Reserve Board; discussions with Bonnar Brown, Assistant Director of the Division, and with Professor Joseph A. Schumpeter of Harvard University; and access to certain tables compiled at the Board by Elizabeth B. Sette. But the writer alone is responsible for any errors which may be contained in this paper.

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¹ *Munn v. Illinois* 94 U. S. 113.

² Robert L. Hale, "Utility Regulation in the Light of the Hope Natural Gas Case," *Columbia Law Review*, vol. 44, 488-495.

³ *Ibid.*

⁴ 320 U. S. 591, cited as "Hope Case."

The value of the going enterprise depends on earnings . . . anticipated."⁵

With one exception (Reed), the Court was unanimous in abandoning value as a rate base. Justices Jackson and Frankfurter, in dissenting, thought the criteria set up in the majority opinion were not precise enough⁶ but they specifically rejected the older doctrine.⁷ This near-complete agreement seems to indicate that the new rule is not likely to be reversed in the near future; its implications become of permanent interest.

Reproduction "cost" was also rejected.⁸ The duty of the regulatory commission is now to ascertain the cost, to the company, of the assets which it has acquired for the purpose of operation. In practice, the total book value⁹ of actual securities outstanding is adjusted to approximate the original cost of the properties used. That part of the nominal investment which does not correspond to outlay on tangible assets is to be at least theoretically disregarded; the balance, or the "prudent investment," is the base on which a return may now be calculated.¹⁰

The appropriate return on this base depends on criteria which are entirely financial. "Rates" [prices] which enable the company to operate successfully, to maintain its financial integrity, to attract capital, and to compensate its investors for the risks assumed certainly cannot be condemned as invalid, even though they might produce only a meager return on the so-called 'fair value' rate base."¹¹ In particular, "the return to the equity owner should be commensurate with re-

turns on investments having corresponding risks."¹² The Court noted with approval that the Commission had "considered the financial history of Hope, and a vast array of [economic] data," including some on bond yields.¹³

Thus we have been referred to the capital markets. A fair rate, or composite of fair rates, is not so much to be *determined* as *discovered*: it is a particular point on the existing structure of yields on investments. Expertizing on "fair" rates must be displaced in the attention of public bodies by detailed studies of that structure.¹⁴ Their perplexities will derive largely from two related questions: (1) Do we need to find one appropriate rate, or several? (2) What sort of a risk is competition, and how ought it to affect the return on prudent investment?

II

A rate of return will assure "financial integrity" if it enables the company to pay interest and amortization on outstanding obligations according to the contract rate specified. In order to "attract new capital" the company must offer a rate equal to current yields on equally good securities. But there is no warrant for assuming that the contract rate will equal the current yield, even approximately, unless (1) long-term interest rates have been stable since the issuance of the security, and (2) the company is no better or worse a risk, relative to other firms, than it was when the outstanding bonds were sold. Yet, unless these two conditions are satisfied, there

Charles W. Smith, "Testimony . . . On the Relationship of Accounting to Public Utility Rate Regulation," Washington (Federal Power Commission?) 1944; and "Prudent Investment Theory in Public Utility Rate Making," *Accounting Review*, April 1946.

¹¹ Hope case, p. 605.

¹² *Ibid.*, p. 603.

¹³ *Ibid.*, p. 604.

¹⁴ Federal Power Commissioner Nelson Lee Smith, in *Papers and Proceedings of the Fifty-eighth Annual Meeting of the American Economic Association (1946)*, hereafter cited as AEA, p. 414.

⁵ Hope Case, p. 601.

⁶ Hope Case, pp. 645-6.

⁷ Frankfurter, p. 627; Jackson, p. 628.

⁸ Hope case, p. 605.

⁹ In the case of no-par stock, the entire realized proceeds.

¹⁰ Like most summaries, this one does violence to the complex task of actually deciding which part of the investment was not "prudent." See W. A. Paton, "Accounting Practices of the Federal Trade Commission—A Critique," *Journal of Accountancy*, June 1944; reply by John Bauer, *ibid.*, October 1944; and, in the same issue, excerpts from a decision by the Arkansas Department of Public Utilities. Also,

is no one rate which will meet the two criteria of "integrity" and "attraction." Only if the outstanding bonds are callable and interest rates are sufficiently lower than the coupon rates to make it worth while, can the debt be refunded and the two rates become one.

But if the bonds of a railroad or utility are not callable, refunding is difficult if not impossible, and a decline in interest rates is no reason for a regulatory body to insist on a lower rate of return. Nor is it a solution to require that all future issues be callable; for non-callable issues can usually be sold at a lower yield than can callables.¹⁵ Furthermore, the very issuance of new securities by a company will, if substantial in amount, depress the prices, and raise the yields, of its old ones—especially if the new securities are senior in status to those outstanding, and appear to "get in ahead" of them as claimants for the company's receipts. In August 1946, the announcement of a large issue of debentures by A. T. & T depressed even its proverbially stable common stock.

Let us for the moment disregard these changes through time. At any given moment a utility company has outstanding securities of varying term and degree of risk, and therefore of varying yield. Should one rate—an average—be made to apply to the investment as a whole,¹⁶ or should a separate rate be applied to each type of security?¹⁷ Under the first alternative, all utility companies making the same investment would receive the same rate of return, but the security holders would fare differently as among companies with different capital structures. Under the second alternative, the reverse would be true: utilities varying in their capital structures, and in nothing

else, would receive varying rates of return, while holders of a given type of security would be equally well off. The dilemma may be of practical importance for several reasons.

(A) If the total book value of the outstanding securities was greater than prudent investment and was reduced to equal it, should the burden of dehydration fall entirely on the common stock?¹⁸ Should the commission be empowered to reduce the book value of the stock to the point where the return per dollar of its book value would be the same as the return per dollar of actual investment attributable to the stock—the fair return? If this were not done, the return on book value would probably be too low to attract new capital. New investors, if well informed, would probably (and rightly) insist on preferred shares or on having a higher unit value set on their shares than on the old, partly depreciated ones.

(B) The income tax law permits the deduction of interest paid, but not of dividends declared, in determining taxable income of a corporation. Other things being equal, it becomes cheaper for the company to pay out a given return on investment in the form of interest, since part of the outlay will be offset by lower taxes. Therefore, if we choose to view interest paid out as a cost of operation, it is obviously not a net cost; if it is considered part of the return on total invested capital, it represents a greater net return (after tax). So long as corporate income taxes continue at present high levels, debt financing will accordingly be more economical than equity financing. This makes for a relatively heavy burden of fixed charges,

¹⁵ As in the Public Utilities Commission of the District of Columbia, *In the Matter of Potomac Electric Power Co.*, July 22, 1944.

¹⁶ For a discussion of the legal issues, see Hale, *loc. cit.*, pp. 501-502.

¹⁵ If the bonds are sold at a discount, the contrary is true.

¹⁶ As in the *Hops* case itself, and in the Federal Power Commission *Opinion No. 126, In the Matter of Mississippi River Fuel Corporation*, November 9, 1945.

which may prove troublesome or even ruinous when revenues are low. Moreover, the charges may be carried, but the corporation may yet be thrown into insolvency because it is unable to redeem a maturing obligation which was placed years ago when the current difficulties could not possibly have been foreseen.¹⁹

(C) Nor are debt securities a homogeneous class. Consider only one source of variation: the term of the loan. Prior to 1930 short-term interest rates in this country were usually higher than long-

¹⁹ Cf., 79th Congress, 2nd Session, Senate Committee on Interstate Commerce, Report No. 925, "Investigation of Trustships Under Section 77 of the Bankruptcy Act and Railroad Equity Receiverships," pp. 56 ff.

TABLE I—INTEREST RATES ON TWO TYPES OF RAILROAD DEBT: 1946

RAILROAD	Median of Yields on:		
	Equipment Trust Certificate	All Other Funded Debt	Difference
Atchison Topeka, & Santa Fe.....	1.25	3.01	1.76
Baltimore & Ohio.....	1.50	3.86	2.36
Chesapeake & Ohio.....	1.25	2.40	1.21
Chicago, Burlington & Quincy.....	1.08	2.91	1.83
Chicago, Milwaukee, St. Paul & Pacific.....	1.35	3.75	2.40
Chicago & Northwestern.....	1.40	2.78	1.38
Rock Island.....	1.25	*	....
Delaware, Lackawanna & Western.....	1.45	5.22	3.77
Denver & Rio Grande.....	1.53	*	....
Duluth Missabe & Iron Range.....	1.20	3.00	1.80
Erie.....	1.45	2.90	1.51
Florida East Coast.....	2.25	4.17	1.92
Grand Trunk.....	1.47	2.13	.66
Great Northern.....	1.00	2.93	1.93
Illinois Central.....	1.53	2.84	1.31
Lehigh & N. E.....	1.25	2.85	1.60
Louisville and Nashville.....	1.35	2.87	1.52
Maine Central.....	1.35	4.72	3.37
Missouri-Kansas-Texas.....	1.42	4.96	3.54
Missouri-Pacific.....	1.40	*	....
Nashville, Chattanooga & St. Louis.....	1.35	2.89	1.52
New York Central (Incl. N. Y. & Harlem).....	1.50	3.50	2.00
N. Y., N. H., & Hartford.....	1.42	*	....
Northern Pacific.....	1.30	4.14	2.84
Pennsylvania.....	1.45	3.16	1.83
Pere Marquette.....	1.33	3.16	1.83
Pittsburgh & West Virginia.....	1.13	4.40	3.27
St. Louis-San Francisco.....	1.35	*	....
Seaboard Air Line.....	1.90	*	....
Southern Pacific.....	1.55	3.99	2.44
Southern.....	1.35	3.46	2.11
Wabash.....	1.18	3.05	1.87
Western Maryland.....	1.20	2.38	1.18
Wheeling & Lake Erie.....	1.28	2.14	.86
	Md. = 1.35	Md. = 3.01	

* Not available (railroad in reorganization).

Source: Compiled from Moody's Bond Record, June 21, 1946.

term.²⁰ But the opposite pattern, after prevailing nearly two decades, has now become the "normal" one; moreover, it has been practically guaranteed by the Government. The spread between long and short rates is considerable. By carefully estimating the time necessary to make effective use of borrowed funds, corporations have been able to make appreciable savings by borrowing on intermediate term.²¹

Table I illustrates the effects, on railroad financing, of differences in term and, to some extent, in safety of principal.²² An average of the rates in the table is hardly necessary and might be misleading. The median cost of borrowing through certificates would in nearly every case be under 1½ percent, and less than half the median cost of borrowing otherwise. Small wonder that most railroad equipment financing is expected to be through certificates.²³

Term loans (for one to ten years) are a comparatively recent innovation, having so far been used chiefly by industrial and utility corporations. Not only shorter maturity, but also the safety derived from

more intimate knowledge of the borrower on the part of the lender have permitted relatively low interest rates on this type of obligation, which has accordingly "tended to displace . . . public issues of securities through investment bankers."²⁴

To sum up this section. (1) Even if a regulated company issues nothing but a single type of bond, there may be no one yield which will be only just high enough to insure both financial integrity and, at the same time, ability to attract new capital. (2) Furthermore, if two or more companies differ in their capital structure, then (a) equal return on their respective total investments would not mean (b) equal return to each type of security holder. If (a) were a criterion of fair return, (b) would not be fair, and vice versa. The optimum financial structure of the corporation—with respect to stock valuation, debt versus equity financing, and the term structure of debt—will differ accordingly.

This would be the case even if the credit of all issuing corporations were equally good. But the reader will surely have noted in Tables I and Ia the wide

²⁰ Most interest theories would lead us to expect the contrary. For the clearest statement, see J. R. Hicks, *Value and Capital* (Oxford University Press, 1946), pp. 144-147. But an examination of Appendix Table 10 in F. R. Macaulay, . . . *Bond Yields, Interest Rates, and Stock Prices* . . . (New York: National Bureau of Economic Research, 1938), shows that in the United States from 1857 through 1929, the short rate was above the long during 670 months out of 876. The writer hopes to develop the relation of short to long rates in another paper.

²¹ The FPC opinion cited above (No. 126), p. 16, noted and apparently approved that a company under its jurisdiction borrowed on term at rates lower than those on its bonds.

²² The average maturity of certificates is usually either 5 or 7½ years. Title to the equipment remains in the certificate holders until the debt is extinguished.

²³ "Renascence Seen for Rail Trusts," *New York Times*, June 16, 1946.

²⁴ Neil H. Jacoby and Raymond J. Saulnier, *Term Lending to Business* (New York: National Bureau of Economic Research, 1942), pp. 1, 13, ch. 4.

TABLE Ia—YIELDS ON RAILROAD INCOME BONDS, MID-1946

Moody's Grouping	Issues: Total	Moody's Rating						Yields:	
		Baa	Ba	B	Caa	Ca	C	Low	High
"Least Risk"	6	1	3	2				3.19	4.53
"Medium Risk"	6			5	1			4.72	5.26
"Large Risk"	7				7			4.77	8.33
"Greatest Risk"	5				3	2		6.70	8.20

Source: *Moody's Bond Survey*, June 10, 1946.

variations in yields on railroad funded debt. These variations express, in a rough way, the variations in the cost of obtaining new capital which derive from variations in risk. We propose to concentrate attention on only one kind of risk—that of competition.

III

The most important difficulty in applying the new doctrine arises from the varying mixtures of monopoly and competition in the markets in which railroads and utilities must operate. The Court's tacit assumption is that the utility company is so powerful a monopolist, and faces so inelastic a demand, that if left alone it could and would raise its prices and profits to an intolerably high level. The work of regulation is then all in one direction—to reduce the potentially inordinate profits to a reasonable amount, which as already explained, should approximate the market return on an investment of equal size. Anything less would make it impossible to attract capital; anything more would be a payment higher than needed to maintain the services of the utility. So long as the monopoly assumption holds, the rest seems to follow.

(1) But suppose that a given market is served by two or more companies, with two or more prudent investments²⁵ and capital structures. If the same rate of return is set in each case, the prices to be charged will not be the same and business will flow to the cheaper seller. The weaker competitors will make smaller profits or even incur losses; the cost of new capital to them will rise, and with it the proper rate of return. Then prices may again be raised, with further loss of

business, and so on to the inevitable end. If the commission set the same price for the output of each company, rates of return would almost necessarily differ. The most prosperous firms would earn the most on their investment, yet by that same token the rate necessary to attract capital—the fair rate—would for them be lower.

As soon, therefore, as the customers have more than one source of supply; or as soon as a utility corporation draws even part of its revenue from an outside competitive market, the formula begins to creak under the strain of application. Given enough competition, it fails altogether. This, in effect, is the basis of Justice Jackson's dissent. He disagreed with the majority opinion not on the regulation of monopolies but on that opinion's failure to consider the competitive case:

"If two sellers each delivered natural gas to the same town, does anyone imagine that Roe can get or ought to get for his gas five times as much as Doe because he has spent five times as much? The service one renders to society in the gas business is measured by what he gets out of the ground not by what he puts into it, and there is little more relation between the investment and the results than in a game of poker."²⁶

Of course the "Doe and Roe" situation is the normal one of a competitive capitalism. Regulated monopolies can only exist on the fringes, or in the interstices, of such a system, and they can be successfully regulated only if they are sufficiently monopolistic.

(2) What if the competition from another firm, or from other industries, had destroyed a once sufficient monopoly? The Court declined to extend any protection: regulation did not insure that the business would earn any net revenues.²⁷ Yet, although specifically repudiated by

²⁵ The investments have probably been made during different time periods, with different price and wage levels. Planning and construction have been more or less competently—more or less economically—carried out. See footnote 19.

²⁶ *Hoppe* case, p. 649; see also pp. 637, 647-8.

²⁷ *Hoppe* case, p. 603.

the Court, the doctrine that utility investment should possess a value (i.e., deserves a return) simply for having been made is superficially so plausible that it was advanced in the very same year (1944). Appropriately enough, Justice Jackson wrote the unanimous decision against it.²⁸ The purpose of regulation was to curtail "earnings otherwise possible . . . An enterprise whose earning possibilities are already invaded by competition . . . is quite a different problem."²⁹ Regulation "has not and cannot be applied to insure values or to restore values that have been lost by the operation of economic forces." In the particular case, the property had, at the moment, nothing more than salvage value.³⁰

So much for the final loss of economic value, sealed by the law. But such losses do not occur overnight. In general, the size and stability of a firm's income decline only by stages. The yield necessary to assure financial integrity and attract new capital should therefore, we might suppose, also rise gradually. How well does the capital market register the change? Since regulatory commissions are to be guided by this market, the question is of first-rate importance.

(3) The yield on a security registers the most precise and impartial appraisal of the company's prospects that is made anywhere. Into it go current statistics, expectations both particular and general, the mass of commonly received opinion, and knowledge or misinformation which cannot be reduced to figures. Those who rate securities are forced to strive for rules of guidance which can be made explicit. The difficulties are very great,

and it is never clear whether the appraiser is informing the market, or being informed by it.³¹ What arouses our sympathy most is this: in an economy where new enterprises grow by the limitation or destruction of old ones, in ways that cannot be foreseen,³² the forecasts of the market must in the long run *always and necessarily be wrong*. Sooner or later, for any given firm, profits must decline and risk of failure increase. If the firm is a regulated corporation, then its prices must be raised because earnings are less than the fair standard, and because that standard must itself be raised. But we do not know when this will happen; we will almost certainly recognize the development well *after* it has gone too far for prompt initial mitigation.

The reason for this lag is simple enough. New industries and facilities are typically constructed during a cyclical upswing: "a trade boom is nothing else but a period of intense accumulation."³³ The threat of damaging or even ruinous competition from new goods or services may be hanging unseen over the firms in the old industry, but for the time being, so long as new facilities are being constructed and have not yet begun to compete appreciably on the market, the old firms may expect to share in the general prosperity brought about, in part, by that very construction. Profits, dividends, and credit rating will be well maintained. Perhaps, at the end of a prolonged boom, some of the weaker units may start to feel the new competition. In each individual case, it will be easy to point to some particular misfor-

²⁸ *Market Street Railway Company v. Railroad Commission of the State of California*, 324 U. S. 548.

²⁹ *Market Street case*, p. 554.

³⁰ The case differed from the *Hope* case in that the issue was not both the return and the investment, but only the (sales) value of the investment. The basic issue is the same. Cf., p. 2; or, much better, the decision itself, where the *Hope* case was cited and discussed.

³¹ Standard & Poor's Corporation have described their method with commendable detail and candor. See *The Analysts Journal*, first quarter 1946, especially pp. 16-17.

³² Cf., ch. 7, "The Process of Creative Destruction," in Joseph A. Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harpers, 1942); and pp. 120-173 in Arthur F. Burns, *Production Trends in the United States* (New York: National Bureau of Economic Research, 1934).

³³ J. R. Hicks, *Value and Capital*, (Oxford University Press 1946), p. 295.

tune, or to bad management: the soundness of the industry as a whole is not impugned thereby. Only when the ensuing depression bears with unexpected destructiveness on the industry, and some of its strongest units totter or fall, does it become apparent that for some time it has been permanently undermined. Then, and not until then, are relative security yields revised accordingly.

There is nothing strictly necessary about this sequence. However, it seems not only reasonable, but in accord with our knowledge.

Up to about 1914, the collective judgment on the street-railway companies was not unfavorable. The securities of a "well-established" firm needed to bear no higher yield than those of comparable firms in other industries. But accurate knowledge of the industry and of individual firms in it "would have stamped a great many street railway securities of unblemished reputation as an unlikely investment a number of years before this."³⁴ Thirty years later, the Supreme Court was talking about "salvage value."³⁵

There is much more information on the next utility-type industry to come upon hard times. The railroad crisis dates from the early 1920's, at least. Yet we look in vain for capital-market realization of it. Particular railroads might of course be mismanaged into financial difficulties, but the earning power of the industry—i.e., of a representative railroad corporation—was considered "permanent."³⁶

And this stability was reflected in a lower cost of capital. Table II shows that for the 27 years preceding 1930, yields on new railroad bonds were consistently and

appreciably lower than on industrial or public-utility (in the usual narrower sense) issues. From 1903 to 1916 (see Chart 1), utility bonds were not becoming permanently more attractive relative to railroads, while industrial bonds were obviously growing up and becoming accepted in the capital markets. The net effect of the 1916-1921 confusion was to restore the railroads' premium to levels about as high, on the average, as around 1903. From 1921 to 1929, the drift is unmistakable, and a contemporary observer might have expected the utilities to match the railroads some time during the 30's, and the industrials to catch up about fifteen years later. There is no hint of the sharp reversal in relative standing just ahead. For the years after 1929, similar data are not available, but the relatively weak position of railroad

TABLE II—THE RAILROADS' SUPERIOR CREDIT, 1903-1929†

Year	Yield on New Issues	Additional Yield on Issues of:	
	Railroads	Utilities	Industrials
1903.....	4.10	.53	1.59
1904.....	4.05	.55	1.75
1905.....	3.91	.52	1.28
1906.....	4.01	.55	1.17
1907.....	4.30	.61	1.46
1908.....	4.35	.76	1.55
1909.....	4.08	.63	1.08
1910.....	4.21	.58	1.04
1911.....	4.23	.54	.94
1912.....	4.26	.54	.92
1913.....	4.41	.49	.94
1914.....	4.92	.09	1.04
1915.....	4.89	— .08	.68
1916.....	4.75	.71	.51
1917.....	5.10	.30	.87
1918.....	5.79	— .13	.65
1919.....	5.96	.34	.61
1920.....	6.97	.64	.73
1921.....	6.65	.94	1.24
1922.....	5.57	.86	1.20
1923.....	5.64	.64	.91
1924.....	5.26	.87	1.19
1925.....	5.27	.40	.92
1926.....	5.04	.58	.87
1927.....	4.85	.49	.88
1928.....	5.61	.72	.80
1929(a).....	5.24	.25	.85

† Explanation: the "Railroads" column shows the yield on new railroad bond issues; the other columns show the additional yield carried by issues of the other two groups.

Sources: Moody's *Investment Survey*, December 28, 1922, p. 737; July 16, 1925, p. 235; November 7, 1929, p. A-80.

a. First nine months.

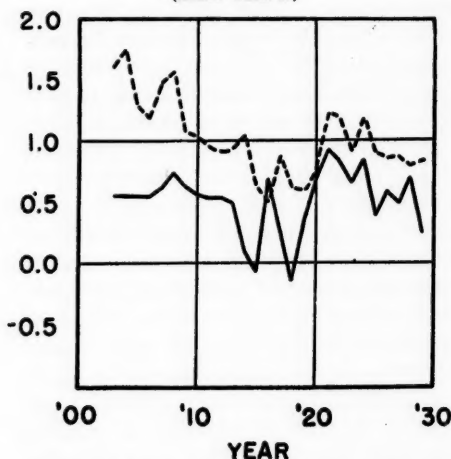
³⁴ Edward S. Mason, *The Street Railway in Massachusetts* (Cambridge: Harvard University Press, 1932), p. 29.

³⁵ *Market Street* case, p. 565. In this respect, Massachusetts and California are not so far apart!

³⁶ W. H. S. Stevens, "Railway Financing, 1890-1940," in *Transportation and National Policy* (National Resources Planning Board, 1942), pp. 180-181.

CHART 1—PREMIUM³⁷ ON RAILROAD BOND ISSUES: 1903-1929*

(Source: Table II)



*Additional yields on new bond issues: *industrials* represented by broken line, *utilities* by unbroken line. Figures to the left are percentages.

securities is common knowledge. Within each of the four best grades of bonds (as rated by Moody's), the rail bonds have borne the highest yields in every year since then.³⁷ At the end of 1945, in the midst of a booming stock market, the railroads' estimate of their postwar stock financing (a measure of their attractiveness to venture capital) was precisely zero.³⁸ But perhaps they misjudge the situation.³⁹

A similar fate may or may not be in store for the now prosperous local utilities. The important point is that if their declining fortunes are ever registered in the rising yields of their securities, there will most likely be, as with the railroads, a belated realization and a fairly sudden lurch in the structure. Today, the interest payments of the utilities are usually con-

³⁷ This statement is based on tables compiled from *Moody's Bond Survey* at the Board of Governors of the Federal Reserve System. My thanks are due especially to Mrs. Elizabeth B. Sette.

³⁸ Interstate Commerce Commission, *Monthly Comment on Transportation Statistics*, December 1945, p. 2.

³⁹ "Brokers interested attribute the better action of many railroad shares, when compared with the industrials, to the

sidered as part of the return on investment; the payments of the railroads are discussed in terms of the heavy financial burden. The difference in preoccupation reflects the difference between existing and vanished monopoly position.⁴⁰

IV

Chart 2 will summarize the last section, and serve as a bridge to this one. Line C is the average unit cost of the regulated company, falling steeply as output expands from very low levels, and then becoming horizontal. (The argument is not affected if C falls throughout, or if it rises after a certain point; but the graph is simplified.) Line S is drawn in such a way that the vertical difference between S and C, multiplied by the horizontal distance from O, will be the same for any amount of sales.⁴¹ In other words, if price and sales volume intersect anywhere on the S-curve, total profit will always be the same.

Assume that the prudent investment, and the rate of return upon it, have been determined. Then there is only one amount of profit which will be neither more nor less than fair. Let this profit be represented by the S-curve. In that case, Chart 2 expresses in graphic form the calculations which will be necessary to fix prices at the level needed to insure the fair return: the point showing price and volume must fall somewhere on S.

Line d_1 shows a part of the demand curve of a company which is an effective monopolist for our purposes.⁴² It is

fact that it is known that traffic will be smaller and costs higher for some time to come." *Wall Street Journal*, June 21, 1946. It is not wholly clear how the Cause produces the Effect.

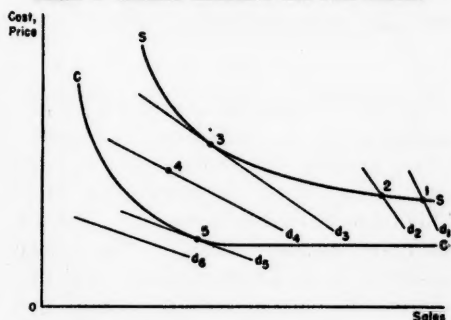
⁴⁰ Cf., Stevens, *op. cit.*, pp. 180, 182.

⁴¹ Throughout the horizontal interval of C, S is a rectangular hyperbola; to the left, S curves more steeply.

⁴² The other d -curves are likewise only sections of demand curves. It is assumed that none of the invisible portions curve in any erratic fashion, or cross the S-curve, except as shown.

obvious that if prices were raised above point 1, sales would be little affected, and profits would be much higher than the fair return of S. This is the case envisaged by the Supreme Court. Lines d_2 to d_6 may be regarded as indicators of progressively less monopoly power. Curve d_2 is not essentially different from d_1 ; the fair return is attainable, but at a slightly higher price and lower output. Curve d_3 is a limiting case: it is barely possible to obtain the fair return. If the company's demand curve is d_4 , the fair return cannot be obtained at any price. Point 4 shows the maximum profit attainable, and it is well short of the S-curve.⁴³ Curve d_5 is another kind of limiting case—it represents a firm which can just cover its costs at one point of output. The firm represented by d_6 will presently be going out of business—it has, according to the *Market Street* decision, no "value" at all: none in law because none in economics.

CHART 2—DEMAND ELASTICITY AND FAIR RETURN



The previous argument comes to this: unless the demand curve of the regulated company cuts or touches the S-curve at some point, there exists no price which can produce the fair return. Since in the normal course of economic life demand

curves do shift, and since realization of the shift is often delayed, it is easily seen how a given price can produce much more or less than a fair return, and under what conditions such a return is impossible. Briefly, if the regulated company is not a sufficiently powerful monopolist in the service it sells or, what comes to nearly the same thing, if consumers will substitute other services in case its price rises or, sometimes, merely fails to fall, then the criterion of prudent investment is of little use. The regulators can permit higher earnings as much as they please; they have no power to produce them.

Again the railroads are our best example. Early in the 1920's, the Interstate Commerce Commission decided that a return of $5\frac{3}{4}$ percent on railroad property was fair. Whether it would also be considered fair at present is not the point. What does matter is that even in a prosperous decade, the return was never attained by the railroad system. This fact "has been thrown at the Commission more than once as evidence of its failure. [But] the oversimplified explanation that the 'fair return' is not obtained because the rates are not set high enough fails to take into account the rather elementary laws of economics."⁴⁴ After 1929, and up to the period of World War II prosperity, the regulatory problem was not to limit the railroads' earnings, but to do something to help keep them out of bankruptcy—where, in fact, a good many of them did land.⁴⁵

When failure is apparently complete (d_6 in Chart 2), the Court, as we have seen, simply drops the whole matter. But the really difficult and therefore in-

⁴³At the sales indicated by point 4, the slopes of the demand and cost curves are equal; i.e., marginal revenue and marginal cost are equal. Inspection will also reveal that marginal cost is (algebraically) increasing more rapidly. Profit is therefore a maximum.

⁴⁴Kent T. Healy, *The Economics of Transportation in America* (New York: Ronald Press, 1940), p. 518; see also p. 216. What Professor Healy thinks of the current railroad publicity campaign featuring a huge and shiny 6 percent can well be imagined.

⁴⁵*Ibid.*, pp. 510, 407 f., for attempts at aid by regulation.

interesting cases are the intermediate ones (d_4). The chart actually understates the disparity between the "fair" and the possible. For if the demand curve shifted to d_4 from the right, then it is most likely that the uncertainty of the firm's income would have increased. If so, its credit would be lower, and the yield necessary to assure integrity and attract capital would be higher than that implied by the S-curve. For this reason, it would be helpful to have an opinion on some intermediate case. But judicial considerations aside, a regulatory commission ought to consider demand in a broader sense than the short run indicated by d_4 . To set price at the point of of greatest immediate profit might be to accelerate the shift away from the services sold by the firm. The revenue gained over a period of several years might well be less than could be obtained by a more far-sighted policy. Commission policy affects not "the" rate of return, but an infinite number of such rates, each referring to a different period.

It appears that a commission will need to make some large economic judgments about the long-run position of a regulated corporation. Whether the rate ought at any given moment to be comparable to those of growing, stable, or declining industries (i. e., demand curves shifting rightward, not shifting, or shifting leftward) might depend upon whether the period of reference ought to be the past year, or three years, or ten, or some other number. Even declining industries might need to attract "new" capital in order to pay off old debts as specified in contracts.

Moreover, as we hinted above, (Sec. III) the problems of long-run change are not really distinguishable from those of cyclical fluctuations. The statistician can-

not remove the trend or the cycle from a time series as neatly as a cook fillets the bones out of a fish.⁴⁶ Still less confidently can he project either element. But if a commission cannot interpret the income in any period as the company's representative income or as temporarily raised or lowered by passing circumstances, how can it decide whether that income is too high, too low, or "reasonable"?

There is a further difficulty. In order to explain it, we shall suppose that the commission is able to segregate the cyclical fluctuations, or that they are too mild to bother about. If, for any reason, revenues were excessive or deficient during the recent past, a policy will be needed on whether the difference should be offset or compensated by changing present prices. The obstacles are easily seen. But if such a program is rejected, cumulative securities such as preferred stocks and income bonds can only be sold at a higher yield. Yet they may be the only means of introducing some badly-needed flexibility into the capital structure of a regulated corporation.⁴⁷

V

Let us now suppose that the regulated company is a sufficient monopolist, whose earnings are fairly steady through time. The above difficulties can probably be surmounted in practice. But will they be squarely faced? The easiest course is to set a rate of return so clearly above the current cost of capital that there will be no great outcry or resistance. To a surprising extent, the great decline of interest rates since 1929 (itself the continuation of a longer movement) has not fully registered in the public consciousness. Even disregarding the "basic," or lowest interest rates, we need only note that the yield on Baa bonds is now about

⁴⁶ Cf., Edwin Frickey, *Economic Fluctuations in the United States* (Cambridge: Harvard University Press, 1942), pp. 9-10.

⁴⁷ Cf., Ralph L. Dewey, "The Maintenance of Railroad Credit," in AEA, pp. 459-460; W. H. S. Stevens, in *ibid.*, p. 494; Hale, *op. cit.*, p. 518.

3½ percent, and the average rate charged commercial borrowers in large cities is around 2½ percent.⁴⁸ Yet the "normal," or "fair," or "reasonable" rate that most people would name seems to be nearer the 6 percent of our elementary arithmetic textbooks. The Association of American Railroads claims to have conducted an opinion survey which revealed that "nine out of ten persons think six percent is no more than a fair profit"⁴⁹ for the railroads. The A. A. R. is hardly a disinterested source. But the *Hope*, *Mississippi River*, and *Potomac* findings mentioned above, all of which were made under the prudent investment doctrine, are in substantial accordance.

It is generally agreed that for better or worse the basic long-term interest rate will probably not exceed 2½ to 3 percent in this generation. Should the local utilities lose none of their present high credit standing over the next decade, and continue to borrow at, say, 2½ to 3½ percent; and should the yields on high grade common stocks stay around 5½ percent,⁵⁰ the facts would become so well established as to become a basis for regulatory action.

For example, a corporation might find its rate being lowered from 6 percent to 4½ percent—the latter figure safely above the current cost of capital for a prosperous utility. This would entail a reduction of total company income, gross of bond interest, of 25 percent. If, say, half the long-term securities were stocks,

the reduction of income available for dividends would be fully 50 percent. Other things being equal, dividends would also be reduced by 50 percent, and the market value of the stocks would decline in roughly the same proportion. Stockholders would sooner or later bear very heavy losses on both income and capital account. Thus initial "kindness" of regulatory commissions may yet lead to unprecedented uproar, both by security holders as a class, and among different types of security-holders.

Conclusion

The Supreme Court doctrine of market rate on prudent investment can be applied to public utility corporations which have sufficient monopoly power to set prices and profits at intolerably high levels if left unregulated. The chief difficulties are at least theoretically surmountable: to insure that the monopoly power exists, to measure the total prudent investment, to define the optimum capital structure, and to find the appropriate yield or yields out of the complex interest-rate structure.

The method cannot be applied to an industry or company which is subject to strong cyclical fluctuations, or lacks monopoly power, or—more generally—which faces so elastic a demand that revenues cannot be raised or lowered to the point of proper return by simply raising or lowering prices. Had the method been applied to the railroads, it would have broken down in the early 1930's.

⁴⁸ *Federal Reserve Bulletin*, August, 1948, p. 985.

⁴⁹ Statement by R. V. Fletcher, President of the A. A. R., February 17, 1947.

⁵⁰ *Standard & Poor's Outlook*, March 22, 1948, p. 881.

Correction. Prof. Emery Troxel, writing on "Price Discrimination in Space Heating" in the August 1948 issue of this journal, was beset by a printer's devil. A typographical error crept into a formula used by Mr. Troxel (on page 282, second paragraph, eighth line) which changed its meaning to "no-sense." In the hope that any reader of that article who found himself amused or baffled will also read this correction we hasten to tell you that the formula

should have read: $\frac{P_1}{MC_1} > \frac{P_2}{MC_2} < \dots < \frac{P_n}{MC_n}$.

Reports and Comments

Correlation Between Value of Dwelling Units and Altitude

The Problem

THE increasing decentralization of population within cities and metropolitan regions has been the subject of considerable study. It has been recognized that the resulting distribution of residential areas generally follows a pattern of concentric circles with the rentals (or values) of homes increasing toward the periphery and that this pattern is frequently modified by sectors of higher class residential areas extending more or less continuously from the city center in one or more directions. The influence of climatic factors has also been duly noted, in particular the advantage of locations to the windward of the sources of smoke, resulting in the wealthy "west-ends" and poor "east-ends" to be found in several big cities. It is also, of course, generally recognized that these patterns are modified by topography; however, as far as this writer is aware, no attempt has been made to measure the correlation of types or classes of urban land uses with topographic data.

A map of the Philadelphia Metropolitan District, showing residential areas by rental classes as of 1940 reveals neither a typical concentric pattern nor any clearly defined sectors, nor a decisive influence of wind directions (predominantly southwestern during the summer), but indicates a strong correlation with altitude above sea level. In the following study an attempt has been made to measure this correlation by filtering out such modifying factors as distance from the city center, location within or without the city limits, and age of dwellings.

Scope and Character of Data

The study covers the Philadelphia Metropolitan District as defined by the U. S. Census of 1940. The District occupies parts of the coastal plain as well as the piedmont plateau, with elevations ranging generally from a few feet above sea level to about 400 feet. Altitudes of 50, 100, 200, and 300 feet

have been chosen as dividing lines between altitude zones.

The Philadelphia City Hall has been assumed to be the center of the Metropolitan District. Distances of the boundaries of the District from the center vary from 10 to 26 miles. Distances of $3\frac{1}{4}$, $6\frac{1}{2}$, 10, and 15 miles have been chosen as dividing lines between concentric zones, the first two because they happen to coincide closely with established boundaries.

Data on value and age have been taken from the U. S. Census of 1940. The "average monthly contract or estimated rent" has been taken as indicative of average value of all dwelling units (inhabited and vacant) enumerated by the Census in each census tract or minor civil division, though the census average has been derived only from the units reporting rent. It is felt that in compiling data for minor civil divisions or for groups of census tracts this method involves a smaller source of error than would have a complete omission of the non-reporting units.

The data on age of dwelling units, as presented by the Census, do not lend themselves to expression in terms of average or median age. Therefore age has been characterized by the percentage of dwelling units built since 1900. The year 1900 appears to be an appropriate dividing line between "old" and "new" residential areas, not so much because it marks the beginning of the century, but because it coincides with the general spread of the electric street car, the first means of cheap rapid transit that made urban decentralization a mass phenomenon. The percentages of dwelling units built since 1900 have been based on all dwelling units in each census tract or minor civil division, not only on those reporting age. This appears justified because inspection of data given by the Census for census tracts and blocks indicates strongly that the overwhelming majority of units not reporting age were built before 1900. In evaluating the data on age it is necessary to

keep in mind that they refer to the age of the original structure; thus, a house built in 1890 and converted into three apartments in 1930 would appear as three dwelling units built before 1900.

The data on distance from the City Center and on altitude above sea level refer to territorial units in which the majority of dwelling units are located within the given distance or altitude range, according to judgment based on inspection of maps. The units used are as follows: within the city of Philadelphia, 67 "subsections" established by the Philadelphia City Planning Commission by grouping of census tracts (except for the division between the altitude classes of 200 to 300 feet for which subsections were broken down into census tracts); within the cities of Camden and Chester, wards; for the balance of the Metropolitan Districts, minor civil division.¹

In all computations the historical central city of Philadelphia, from South to Vine Street and from river to river, has been omitted. This small area of roughly two square miles, containing 16,146 dwelling units, differs sharply from the surrounding area. While population per dwelling unit averaged 3.80 for the city, it was under 3.00 for most census tracts in the central city and over 6.00 for another tract which contains many rooming houses. The vacancy rate was 11.2%, compared to a city average of 4.9% and the average rent was \$42.75, compared to \$31.22 for the city. It is interesting

to note that these specific central city characteristics are to be found only within three-quarter miles from City Hall, while the fifth and sixth wards (census tracts 5A and 6A) show characteristics close to those of the surrounding area. However, in order to preserve the identity of the historical city core, these have been included in the central city and the entire central city has been excluded from all computations in order to avoid serious distortions. Census tract 39K, occupied by the U. S. Naval Base, has been excluded also. Finally, all census tracts containing three or less dwelling units have been omitted.

Influence of Decentralization

Before the investigation is carried further, it is desirable to establish how far the Metropolitan District represents a unified residential area related to the business center of Philadelphia. Some light is shed on this question by Table I and Diagram A which present age and value of dwelling units by concentric zones.

Both the percentage of new dwelling units and the rental value increase up to the $6\frac{1}{2}$ -10 mile zone and then decrease again to points below the average of the Metropolitan District. The figures indicate that up to 1900 the actual city was concentrated largely within an hour's walking distance from City Hall. Almost three quarters of all dwelling units in the $3\frac{1}{4}$ - $6\frac{1}{2}$ mile zone and more than five-sixths in the $6\frac{1}{2}$ -10 mile zone are in structures built during this century, since the development of means of cheap mass transportation. However, it seems that *residential decentralization has not gone substantially beyond the 10-mile circle*. The fact that in the outermost zone both the percentage of dwelling units built since 1900 and the average rent

¹ Data on age of residential structures for wards of Camden and Chester and for most townships have not been published by the U. S. Census of 1940. Therefore, in analyzing these data, the cities of Camden and Chester have been treated as units and the townships for which data were not available have been omitted. These townships contained 10.4% of all dwelling units in the Metropolitan District, or 31.3% of those outside the city.

TABLE I—PERCENTAGE OF DWELLING UNITS BUILT SINCE 1900 AND MONTHLY CONTRACT OR ESTIMATED RENT OF DWELLING UNITS, PHILADELPHIA METROPOLITAN DISTRICT, BY LOCATION IN FIVE CONCENTRIC ZONES: 1940

	Distance From City Center (miles)					Total
	Under $3\frac{1}{4}$	$3\frac{1}{4}$ - $6\frac{1}{2}$	$6\frac{1}{2}$ -10	10-15	Over 15	
No. of Dwelling Units.....	263,941	260,154	126,474	61,689	55,079	767,337
Percentage of Dwelling Units Built Since 1900.....	35.6	72.7	84.0	59.5	52.8	58.2
Average Monthly Rent (Dollars).....	25.70	34.10	48.45	38.50	30.50	33.70

are lower than the average for the Metropolitan District and that in the 10-15 mile zone both indices are only slightly above the average indicates that these zones are not inhabited by large numbers of "suburbanites," but mainly by the locally employed population, about 30% of whom live in the industrial satellite towns of Chester, Norristown, Phoenixville, Lansdale, Bristol, and Burlington.² Data for the two outer zones therefore may be determined largely by conditions in these relatively independent outlying centers and are not necessarily representative of the population distribution within a metropolitan area, if such an area is defined as the area dependent on a metropolitan center.

Influence of City Boundary

It has often been stated that flight from high city taxes is a major factor in the decentralization process. If this assumption is valid we may expect to find differences between the areas inside and outside the boundary of the central city, independent of the distance from

the city center. Therefore the data which were presented for the Metropolitan District as a whole in Table I have been broken down for areas inside and outside the city limits in Table II. As is to be expected, the percentage of new dwelling units is much greater outside than inside of the city and the average rent is correspondingly higher. Generally, the same holds true for each individual zone.

A deviation from this general pattern is to be found in the 6½-10 mile zone, that is, in the zone which by peak figures both for percentages of new dwelling units and for rentals stands out as the typical "suburban" zone; here the percentage of new dwelling units is lower outside than it is inside the city limits. This seems to indicate that desire to escape city taxes is not a factor in the suburban trend. On the other hand, despite this lower percentage of new dwellings, the average rent in this zone is 8½% higher outside the city than it is inside. This might indicate a preference of the highest income group for locations outside the city. The material on this point is inconclusive.

More important is the discrepancy between data on age and on rent found in comparing the 6½-10 mile and the 3¼-6½ mile zones outside the city. While the percentage of new dwelling units is slightly lower in the outer zone (82.0% as compared with 87.1%), the average rent is almost 30% higher (\$49.95 as compared with \$38.60). This discrepancy indicates that other factors than age, distance

TABLE II—PERCENTAGE OF DWELLING UNITS BUILT SINCE 1900 AND MONTHLY CONTRACT OR ESTIMATED RENT OF DWELLING UNITS, PHILADELPHIA METROPOLITAN DISTRICT, BY LOCATION IN FIVE CONCENTRIC ZONES, BY LOCATION INSIDE AND OUTSIDE THE CITY OF PHILADELPHIA: 1940

	Distance From City Center (Miles)					Total
	Under 3¼	3¼-6½	6½-10	10-15	Over 15	
Percentage of Dwelling Units Built since 1900						
Inside City.....	33.3	69.8	85.5	55.7	.....	53.5
Outside City.....	56.3a	87.1	82.0	60.1	52.8	70.8
Average Monthly Rent (Dollars)						
Inside City.....	25.90	32.90	46.00	35.05	.....	31.00
Outside City.....	21.95	38.60	49.95	38.45	30.50	38.90

^a The only area outside the city limits within a distance of 3¼ miles from Philadelphia City Hall is the older part of Camden, wards 1 to 10, which show considerably lower rents than do equidistant areas in Philadelphia. However, because of lack of published census data, the figure for "percentage of dwelling units built since 1900" for the same zone relates to the entire city of Camden, including the outlying newer wards 11 to 13 and is therefore not comparable. The age-percentage figure for the following zones (3¼-6½ miles) may also be slightly distorted by exclusion of these wards.

TABLE III—NUMBER AND AVERAGE CONTRACT OR ESTIMATED RENT OF DWELLING UNITS IN PHILADELPHIA METROPOLITAN DISTRICT, BY FIVE ALTITUDE ZONES, INSIDE AND OUTSIDE THE CITY OF PHILADELPHIA: 1940

Altitude Above Sea Level (feet)	Under 50	50-100	100-200	200-300	Over 300	Total
Number of Dwelling Units...	215,953	243,227	163,254	105,306	35,597	767,337
Average Rent (Dollars)						
In Entire Metropolitan Dist.	24.30	29.45	35.90	46.50	64.80	33.70
Inside City.....	23.15	28.50	33.70	46.40	57.05	31.00
Outside City.....	26.40	33.20	39.90	46.70	67.00	38.90

from city center, and political boundaries have to be studied.

Altitude Above Sea Level and Rental Value

As indicated above, altitude above sea level may be such a factor. Some pertinent data are presented in Table III.

The table shows a very strong and consistent correlation between altitude and rental value. Roughly, *an increase of one foot in altitude corresponds to an increase of ten cents in monthly rent.* This correlation might conceivably be due to the fact that the higher altitude zones are more distant from the city center. Therefore each altitude zone has been broken down by distance zones in Table IV.

While the figures within each separate altitude zone (horizontal columns) repeat the pattern shown on Table I and diagram A, with a peak in the $6\frac{1}{2}$ -10 mile zone, the figures for varying altitudes with each sepa-

rate distance zone (vertical columns) show in every case a consistent correlation between rent and altitude, with only one slight exception in the outermost zone, where metropolitan influences are weakest.

As shown on Table III, the average rental, within each altitude zone, is higher outside than inside the city limits. The question arises how far these differences are due to differences in age. Table V illustrates the correlation between altitude and age of dwellings, separate for areas inside and outside the central city.³

Only the areas under 50 feet outside the city and only those under 100 feet altitude inside the city show percentages of new buildings significantly lower than the balance of the Metropolitan District; all other groups show no significant differences, neither as to age nor as to location within or without the city. It may be tentatively concluded that the

³ For age data outside city see footnote 1.

TABLE IV—AVERAGE MONTHLY CONTRACT OR ESTIMATED RENT IN PHILADELPHIA METROPOLITAN DISTRICT, BY FIVE ALTITUDE ZONES, BY FIVE DISTANCE ZONES: 1940

Average Monthly Rent (Dollars)	Distance From City Center (Miles)					Total
	Under $3\frac{1}{4}$	$3\frac{1}{4}$ - $6\frac{1}{2}$	$6\frac{1}{2}$ -10	10-15	Over 15	
At Altitudes						
Under 50 Feet.....	23.05	26.15	29.90	25.75	22.75	24.30
50-100 Feet.....	26.45	28.45	37.60	31.50	29.90	29.45
100-200 Feet.....	33.60	37.85	38.80	37.10	28.90	35.90
200-300 Feet.....	.....	43.60	56.15	45.30	35.03	46.50
Over 300 Feet.....	.....	.....	70.00	68.20	39.73	64.80
ALL ALTITUDES.....	25.70	34.10	48.45	38.50	30.50	33.70

close correlation between rent and altitude presented in Tables III and IV is not a function either of age or of location relative to the city boundary. This conclusion is confirmed by the data showing the correlation between the four factors discussed—rent, altitude, age, and relation to city boundary—as presented in Table VI.

Out of 25 groups which are equal as to both age and altitude, 16 yield figures for average rent separately for dwelling units inside and outside of the city; in 7 cases the rent is higher inside, and in 9 cases it is higher outside the city. The influence of location inside or outside the city appears to be negligible and therefore Table VII summarizes the data of the breakdown of rents by age and altitude for all areas within the Metropolitan District, regardless of city boundaries.

Inspection of Table VII and Diagram B shows that rental value is correlated more strongly and consistently with altitude (vertical columns on table and full lines on diagram) than with age of residential structures (horizontal columns on table and broken lines on diagram).

Summary of Results

In the Philadelphia Metropolitan District, in 1940, rental value of dwelling units was more closely correlated with altitude above sea level than with any of the other factors investigated. Correlation with age of structure was also close, as would be expected. Correlation with distance from city center was positive up to the $6\frac{1}{2}$ -to-10-mile zone, inverse thereafter. No significant correlation was found with location inside or outside the political boundaries of the city. The latter indicates that in the Philadelphia region the desire to escape city taxes was not an important factor in the trend toward decentralization.

Tentative Explanations

Data assembled within a single metropolitan area are evidently insufficient to establish definite conclusions. Interpretations in terms of causal relationships can be merely working hypotheses, to be tested by further research. Several reasons may account for the higher values found at higher altitudes:

- (1) They enjoy a considerable climatic advantage, in particular cooler nights in summer.
- (2) The rolling piedmont country is scenically more attractive than the flat coastal plain.
- (3) The rolling upland terrain lends itself less readily to low-cost housing development by straight unbroken rows of houses.

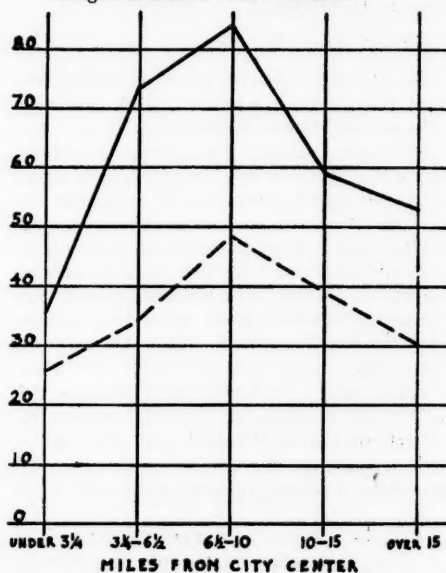


Diagram A—Percentage of Dwelling Units Built Since 1900 (unbroken line), and Average Contract or Estimated rent (broken line). In Five Concentric Zones, Philadelphia Metropolitan District, 1940.

TABLE V—PERCENTAGE OF DWELLING UNITS BUILT SINCE 1900 IN PHILADELPHIA METROPOLITAN DISTRICT, INSIDE AND OUTSIDE CITY, FOR FIVE ALTITUDE ZONES.

Percentage of Dwelling Units Built Since 1900	Altitude Above Sea Level (Feet)					Total
	Under 50	50-100	100-200	200-300	Over 300	
Inside City.....	32.9	47.8	75.2	75.7	77.9	53.5
Outside City.....	59.7	77.5	73.8	66.8	84.5	74.0

- (4) The low-lying areas of the coastal plain, intensely served by water and rail transportation and offering level sites, have been developed largely by industry; as a result, low income groups have settled there close to their places of work.

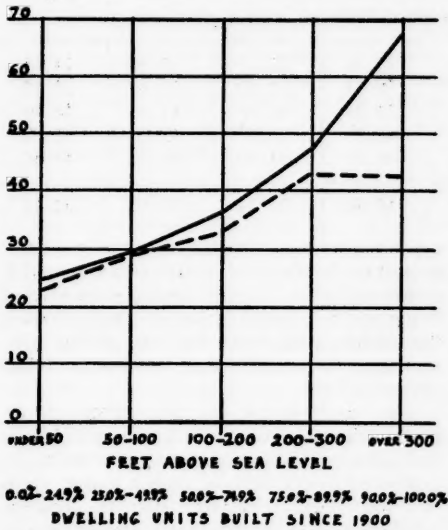


Diagram B—Average Contract or Estimated Rent by Altitude Zones (unbroken line) and by Five Age Classes (broken line). In Philadelphia Metropolitan District: 1940.

TABLE VI—AVERAGE MONTHLY CONTRACT OR ESTIMATED RENT, IN DOLLARS, IN PHILADELPHIA METROPOLITAN DISTRICT, 1940, BY FIVE ALTITUDE CLASSES, BY PERCENTAGE OF DWELLING UNITS BUILT SINCE 1900, INSIDE AND OUTSIDE CITY

Altitude (Feet)	Location	Percent of Dwelling Units Built Since 1900					Total
		0.0–24.9	25.0–49.9	50.0–74.9	75.0–79.9	90.0–100.0	
Under 50.....	Inside	20.50	25.30	24.05	21.95	.....	23.20
	Outside	.....	22.30	26.33	23.98	39.70	27.15
50–100.....	Inside	24.20	29.40	27.45	30.90	39.90	28.50
	Outside	.....	.....	39.07	35.51	37.82	36.30
100–200.....	Inside	86.20*	32.00	29.45	37.25	36.45	33.75
	Outside	.....	31.15	28.47	58.15	49.50	42.10
200–300.....	Inside	.....	52.15	43.15	55.85	42.95	46.50
	Outside	.....	31.00	66.45	39.63	.....	54.90
Over 300.....	Inside	29.00*	139.00*	52.90	64.00	47.50	57.00
	Outside	.....	.....	42.10	94.22	56.10	72.30
Total.....	Inside	22.80	29.40	30.25	38.25	39.60	31.00
	Outside	.....	28.95	31.50	54.00	48.25	39.95

* Tables VI and VII do not cover those townships for which data on age of dwelling units have not been published; an asterisk indicates that number of dwelling units in group is less than 250 (28, 54, and 206, respectively). Under omission of these three groups, the data given in Table VII are presented graphically in Diagram B.

- (5) Smoke, dirt, and noise from railroads and industries have caused the middle- and upper-income groups to avoid living in these areas.
- (6) Finally, members of these groups prefer to live in areas inhabited by their own groups and separated from the lower income groups, and this segregation has been strengthened by zoning legislation.

In addition, for the areas below 100 feet, the greater age of structures is a contributing factor towards low rents; this is a result of local conditions—Philadelphia, like many American cities, having originated as a port. As Table V shows, within the city rental values are uniformly low in areas below 50 feet, regardless of age of dwellings.⁴ In these areas, some of which are unsewered, only the cheapest and generally substandard type of housing has been built.

The Question of General Validity

If the six points enumerated above are actually the reasons for the surprisingly close correlation between altitude and rent found in the Philadelphia area, this correlation should obtain in other urban areas also. Some random observations point in this direction. In Cincinnati "the general picture is

⁴ As noted above, the historic central city core is not included in the tabulations.

TABLE VII—AVERAGE MONTHLY CONTRACT OR ESTIMATED RENT, IN DOLLARS, BY FIVE ALTITUDE ZONES, BY PERCENTAGE OF DWELLING UNITS BUILT SINCE 1900, IN PHILADELPHIA METROPOLITAN DISTRICT: 1940

Altitude (Feet)	Percent of Dwelling Units Built Since 1900					Total
	0.0-24.9	25.0-49.9	50.0-74.9	75.0-79.9	90.0-100.0	
Under 50.....	20.50	25.10	25.30	23.15	39.50	24.45
50-100.....	24.40	29.35	28.55	32.50	39.40	29.50
100-200.....	86.20	31.50	29.25	40.95	41.65	36.20
200-300.....	.....	44.50	48.95	54.60	43.00	47.75
Over 300.....	29.00	139.00	48.50	94.70	54.50	67.50
TOTAL.....	22.90	29.15	30.80	43.15	42.50	33.15

a steady movement of population out of the Basin area to the hilltops,"⁸ and in New York, Los Angeles, Baltimore, Cleveland, Toronto, residential values seem to follow similar patterns. Among European cities, Vienna, Hamburg, Rome, Naples, Istanbul come to mind. Rather interestingly, even in Mexico City, where the lowest point is 7000 feet above sea level, the highest residential values are to be found on the hills of Chapultepec and San Angel.

If high residential values are an index of consumer preferences, the desire to live on higher land appears to be one of the most

important factors in shifts of residence and it seems probable that with rising standards of living and improved means of transportation the middle and lower income groups may also tend to move to areas located at higher altitudes.

The implications for city planning are obvious; in particular, the questions of blight and urban redevelopment may have to be re-evaluated in the light of such a trend. It is therefore highly desirable that the general validity of the correlation between rental value and altitude be tested by studies in other cities and regions.

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⁸ City Planning Commission, Cincinnati, "Public Service Facilities," 1947.

Korean Farm Tenant Purchase Program*

UNITED States Army Military Government authorities in South Korea have recently conducted one of the largest and most successful tenant-purchase programs in modern history: 1,400,000 farm plots formerly owned by the Japanese have been sold to 588,000 Korean tenants at a fair and reasonable price—to be paid *in grain* over a period of fifteen years. Farmer response to the program has been enthusiastic. The ordinance creating a new National Land Administration in Korea to run the program was signed by Major General William F. Dean, Military Governor, on March 22,

1948. By the fifth of July, 85 percent of all the farms had been sold, with completion of the program expected by the end of September.

The land-reform problem in Korea is considerably greater than can be met by the present sale of ex-Japanese lands. Although this program will sell lands to 28.5 percent of the South Korean farmers, another 40 percent¹ are tenants renting land from private Korean landlords. The tenant-purchase plan does not relieve them. The future Korean government will probably attempt some type

With the land-sale well under way, Mitchell returned to the United States in June 1948 to accept a Littauer Fellowship in Public Administration at Harvard University.

* The author has spent two years as a Military Government official in Korea. From September 1946 to May 1948 he was Administrator of the National Land Administration and its predecessor agency, the New Korea Company, Ltd.

¹ Figures given here are estimates only. Adequate census studies have not been made since the Japanese surrender.

of land-reform—the platforms of all the major political parties represented in the Korean National Assembly elected May 10, 1948 include land-reform planks. This present program, however, will raise the proportion of farmers owning all or most of their farm lands to about 60 percent of South Korea's total. This, in a country where at the time of the Japanese surrender the number of tenants, continuously on the increase in the past several decades, had risen to about 70 percent of the total number of farmers, is a sizeable contribution.

The present program was planned in the hope that it would serve as a pattern for future development in Korea and other Far East areas. Certain features were incorporated in the plan that should eliminate the criticism that has been levelled at the so-called "land-reform" in the Soviet zone of North Korea and at the not too successful U.S.-sponsored land-reform in Japan. It was felt by the joint Korean-American staff of agricultural economists who set up the plan that it could be extended easily to the entire tenancy problem in South Korea, with reasonable satisfaction both to the tenants and to the Korean landlords whose land would be purchased by the government.

Title. Title passes to the farmer on the day he signs his mortgage, and is registered in the official land records in the manner customary in Korean law. This document has proved immensely gratifying to the farmer. When Military Government and Korean officials planning the program were faced with the alternatives of selling outright (deed and mortgage) or selling on installment sales contract (deed to be delivered at the completion of payments), many good arguments were heard on both sides. Farmers were polled and the overwhelming majority reported they wanted their "deed in their hands." Response of the farmers to the land-sale has proved the wisdom of the deed-mortgage method.

Price and Payment Terms. The farm plots are sold to the tenants for a price expressed in measures of grain (the standard measures are the *suk*, 330 pounds, and the *mal*, 33 pounds). The farmer agrees to pay three times the average annual production, computed on a very liberal basis,² for the land. He has fifteen years in which to pay, which means that his minimum payment yearly is twenty percent of an average year's crop.

However, the farmer will ordinarily pay more than this—he will prefer to pay in advance and thus complete the liquidation of his mortgage at an earlier date. In cases where a crop failure or other calamity makes it impossible for a farmer to turn in his yearly installment of grain, his payment schedule may be postponed.

The Korean tenant-farmer, under the Japanese, paid a rental charge in kind of from 50 to 70 percent of his crop. The first land-reform measure undertaken by the U. S. occupation authorities soon after surrender was the reduction of all rents to a maximum of one-third. The new land-scale plan will allow the farmer to buy his land for less than he formerly paid as rent; after he has made his minimum annual payment and paid the taxes (which as owner he must assume) he will still be in as good position as when he was a renter in 1946 and 1947, and far better than when he was under the Japanese.

Rationing and Grain Collection. Distribution of rationed food to the one-third of South Korea's population who live in the urban areas will probably continue for several years. Collection from the farmers probably will be continued by the Korean government to meet these ration demands. During the past two years the amount collected from farmers has averaged about one-third of their production; the government has paid the farmer at legal prices for the grain turned in. The continuation of grain collections will probably work to induce tenant-purchasers to retire their mortgage as rapidly as possible in the following manner: Let us assume that Farmer Kim owns one plot of land, producing 9 *suk* of grain, and is buying from the National Land Administration one plot producing 10 *suk*. His rice quota in 1948 assigned during the government collection drive will be about 6 *suk*, leaving the balance of 13 for his family needs. His minimum payment to the N.L.A. on his mortgage probably will be 2 *suk*. Payments to the N.L.A. are included in the government quota. Therefore, he would turn in his 6 *suk* quota, receiving credit for the 2 *suk* he owed on his mortgage and cash for the 4 *suk* at legal prices. Inasmuch as the legal price of grain is very low relative to the free market price of all commodities, the

² The official land classification figures, reduced by 40 percent to allow for the lowered productivity of Korean lands during present fertilizer and equipment shortages, are used, together with actual production records, to set the price on the land.

farmers are disdainful of the small amount of cash they receive from the government for their grain. They will in most cases prefer to allow the entire quota, whether the grain came off their tenant-purchase plot or not, to be applied on their tenant-purchase mortgage. The cash needs of their families can be met from the sale of small quantities of grain or vegetables in the free market.³ Some farmers have already indicated their intention of retiring their mortgage in six years.

Protection and Assistance to the Farmer. Certain protections to the farmer and the government are included in the land-sale ordinance. The farmer may not sell or mortgage his land while it is mortgaged to the N.L.A., or for ten years from date of purchase, whichever is the longer period. This provision is included to prevent speculators getting possession of the land. During the ten-year period, the Korea government must determine how to protect all its small owners from money-lenders and loan sharks—it will be unfortunate if these owners are forced by hard times to revert to the tenancy status within the next few years.

Landlord Functions. The essential economic functions performed in the past by the landlord have been retained; production credit and credit for family emergencies are to be furnished at low interest rates; large-scale improvements and reclamation will be carried out by farmers' cooperatives, financed by the National Land Administration; production supervision and farming advice will be furnished by the 3600 field workers and tenant supervisors of the organization. (They are neighborhood agricultural leaders who have worked with the farmers for many years.) The farmer's loan and payment papers are processed by a system of 208 local N.L.A. offices.

Political Pressure in the Land-sale. The United States officials in charge of the land-sale were insistent that disposal should be made to the tenants who had been cultivating the land successfully, without regard to creed or political alignment. No criterion of eligibility was allowed except the record of rent and grain quota collection. Most of the Korean government officials and practically all of the political parties insisted that local committees should be set up to screen the

prospective purchasers, to weed out "communists." (*Communism* appeared to mean disagreement with the particular person or group making the charge; communism among the farmers of Korea, as was later shown by the election returns, is practically nonexistent).

The disposal of 1,400,000 farm plots offered such a tremendous opportunity for patronage that most political groups looked with envy on the sale. Strong insistence on the part of U. S. officials that the sale be expedited prevented any screening of purchasers for political acceptability. Such screening undoubtedly would have slowed the program up for years. As it turned out, the officials of the N.L.A. were so busy selling hundreds and thousands of farm plots every week that only the barest of figures and names could be entered on the appraisal and sales forms—individual names and cases were lost in the mass of statistics connected with the sale. It was the opinion of the U. S. officials that the future Korean government could do as it wishes with the various classes of Koreans who were guilty of real or fancied crimes (Japanese collaborators, communists, profiteers, traitors, informers, etc.) on a nationwide basis. It was preferred that this cross-section of Korea's farmers (28.5% of the South Korea farm families) should not receive discriminatory treatment or persecution.

Administrative Difficulties. The tremendous administrative problems met and conquered during the three weeks preceding the first land sale and the first two months of the sale itself are described in an article on public administration problems in occupied areas now in process of preparation by the author.⁴ A few of the highlights can be mentioned here. The program, completely new to the Korean officials of the National Land Administration, was led by a group of Americans who had formerly worked with the Farm Security Administration's Tenant Purchase and Rural Rehabilitation programs, and with the Farm Credit Administration, Rural Electrification, and other U. S. Department of Agriculture agencies. A tremendous number of procedures had to be drawn up, translated first into basic English, and then into simple Korean, for the information of the nearly 7000 Korean

³ When the rice collection quotas were met more than 100% in all except two provinces of South Korea in 1947, a free market was allowed in those which had met their quotas.

⁴ "The New Korea Company, Ltd.: Land Management and Tenancy Reform in Korea under the U. S. Army Occupation, 1945-48", in preparation for publication late in 1948.

employees of the Administration. Forms for the details of the sale had to be printed, thirteen million of them. There were forms for the selection of buyers, appraisal of the farms, sales documents, land registry documents, mortgages, deeds, payment records, notifications to the tax offices, notifications to the tenant-purchaser, and finally, weekly and daily report forms to keep the Military Government headquarters advised of progress and bottlenecks in the sale. Millions of leaflets were dropped by airplane to the farmers, advising them of their rights under the purchase program. The employees were called into a series of meetings, from the main office in Seoul down to the smallest county office. They were briefed in procedures, and trial sales were run for educational purposes. Land registry difficulties which no one could have predicted cropped up, and were met by various procedural makeshifts and short-cuts. Rubber stamps and duplicating stencils were employed to make registry entries that had traditionally been written in Chinese characters by a slow and laborious hand process. The efficiency of the land-registry offices and the tax offices was stepped up a hundred-fold. Transfers in title were made in two months at a rate many times faster than the land office personnel thought they could achieve.

Comparison: Land-Reform in North Korea. The Soviet-sponsored "land-reform" in North Korea was put into effect in March 1946. All farms above a certain minimum size were seized by the government and turned over to the farmers. Title does not pass to the farmer; merely the "cultivation right." The farmer may cultivate his farm as long as he is satisfactory to the local Communist Peoples Committee; if he gets out of line, he is replaced. The farmer cannot sell the land, or perform various other ownership functions. He has to pay an extremely high land tax (27% of his rice crop) plus a "voluntary" rice collection quota which ordinarily leaves him no more than 30 percent of his grain. The North Korea farmers are not fooled by the fact that they were "given" their land.

Comparison: U.S.-Sponsored Land-reform in Japan. Most of the large landlord's holdings in Japan have been taken over by the government in a compulsory purchase scheme and sold to the tenants. The former owners are paid in bonds with a face value expressed in Japanese yen, and are repaid year by year.

The extremely low price set by the government has resulted in wiping out the fortunes of many Japanese landlords. The government price in most cases is one-tenth or less of the current market price of one-year's produce from the land. The tenant, who was expected to pay off his debt in cash over a period of years has found that he can pay off in full by selling only a portion of a crop. Many of the tenants have paid off 100%; most have paid large portions of the purchase price. Inasmuch as the tenant is purchasing his land for a pittance, it is believed by this observer that he will not hold it and work it with the same stubborn initiative and sense of pride that now distinguishes the South Korean farmer. Only time can prove which land-sale program yields the greater results in land productivity, stability of the rural population, and community strength.

Political Effects. The United Nations Temporary Commission on Korea was on hand to sponsor a free national election in the South Korea zone, held by U. S. occupational authorities on May 10, 1948. This election turned out to be a test of communist strength in the zone. The extreme radical leftist parties had previously announced a boycott of the election and the registration for the election. Strength of the communists proved to be very small—the registration was 80 percent of the voting population, and the turn-out on election day was 95 percent of the registered voters. Most interesting was the almost complete failure of the communists to influence any of the rural areas. A great measure of the credit for keeping rural Korea out of the communist camp must be taken by the U. S. authorities for their success in operating and selling the ex-Japanese lands. In a country where tenancy is all too prevalent one would ordinarily expect radical propaganda to make great headway. Yet by election time almost half of the 3.3 million persons farming ex-Japanese land had already bought their farms, and the other half knew that they would soon be given the opportunity to buy. It appears very difficult for communism to gain headway in rural areas where land-reform, long promised, has at last been put into effective operation.

CLYDE MITCHELL

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Book Reviews



Flats: Modern Developments in Apartment House Construction. By H. Kamenka. London, England: Crosby Lockwood & Son, 1948. illus., pp. 144. \$5.25.

Although the author's purpose is not altogether clear, the present reviewer believes that here is a book which should be possessed by every architect who has resolved to do something about better housing.

Mr. Kamenka has selected many attractive photographs and a diverse collection of plans which will be useful for reference. Both good and bad plans are included. It is unfortunate that the captions fail completely to elucidate the plans or to differentiate between desirable and undesirable features.

Mr. Kamenka evidently believes that London may profit by studying the experience of Paris and New York with tall multi-family or "flats." Perhaps this is the explanation of the rather peculiar organization of the book.

Part I is misnamed "Urbanization" but is devoted principally to a discussion of methods of regulation, density, and a few pertinent thrusts at the short-term opportunism which has been typical of housing finance in the United States. The paragraphs on regulation give disproportionate space to the recent attempt to amend New York City's zoning ordinance by an arbitrary tightening of obsolete types of restrictions. From the account given, however, few outside New York would understand the underlying situation. Mr. Kamenka made no apparent attempt to differentiate between the functions of state and city and the various administrative controls which are set up by each.

Part II is entitled "Planning." It is divided into a discussion of "The Block," "The Flat," and "Various Floors." Mr. Kamenka uses the word block in its European sense as meaning a block of houses rather than a block of land bounded by public streets. In his discussion of planning, he refers to the various shapes of buildings: "rectangular, T, E, U, Z, or L-shaped, cruciform,

or any other lay-out," but he subordinates the shape to the type of apartment access. These he differentiates as "corridor," "individual," and "group plan" which he says are applicable to any of the shapes named. "Good planning," he says, "remains based upon the correct application of two main principles: zoning and communications."

Two paragraphs from Mr. Kamenka's discussion of the "corridor plan" are a pertinent criticism of present day trends:

"Hardly ever to be found in Paris, that mode of planning (corridor) has been quite commonly used in London, and may be largely blamed for so many people being allergic to flats.

In New York the corridor principle, abandoned long ago, has made its reappearance in the last few years before the war and has been applied to some of the latest and most expensive apartment houses, as well as to low-rent housing developments. It is an unfortunate reversion produced by a tendency towards small apartments combined with the desire to reduce the number of elevators."

There follows a discussion of the unsatisfactory living conditions created for families dependent on a long corridor where service deliveries and collections conflict with access to the front entrances of the apartments.

One point only seems to be omitted and that is the usual necessary sacrifice of cross ventilation to the economies of corridor access. The "corridor plan" is illustrated by a typical New York H plan, a common and regrettable type, though an improvement on its prototype the twenty-five-foot "dumbbell." Incidentally, Mr. Kamenka did not include the H in his list of characteristic building shapes. Although the example given justifies Mr. Kamenka's criticism of the corridor type, there are other faults in the particular plan which warrant greater criticism. This particular example, furthermore, has failed to realize the possibilities of the "H" type.

Part III, which deals with "Advantages and Drawbacks," contains an interesting discussion of communal amenities, house services, and objections.

Part IV is entitled "Prospects." This consists of a single chapter entitled "Community

Planning" with four sections: The first is "New Trends" with three subdivisions labeled "Parkchester," "Subsidies," "Projects." The second, third and fourth sections are entitled respectively: "Types of Flats," "Civic Pride," "The Dilemma."

To the present reviewer the arrangement of topics is frequently difficult to follow. Some points are treated in detail, others are set off with sweeping generalizations. For example Mr. Kamenka asserts:

"The solution lies in government subsidies, by which the expense of housing the "lower third" is shared by the whole nation and is recuperated in the moral and physical, as well as the economic, asset of adequately housed citizens."

A subsidy is a makeshift rather than a solution. A subsidy is an evidence that something is out of balance. There are many perplexing problems in finance; in real estate; in design and in construction; in material supply; in the administration of public works and of public service. It is these problems which have operated to produce a housing problem. The many complex factors which affect housing must be kept constantly in mind. Subsidies may be temporarily advisable but no technician should ever intimate that subsidies are a solution.

Mr. Kamenka's book is valuable as an approach to the study of the technique of apartment house planning. There is room in the field for continued effort. Others who may follow and may carry the critique of design to higher levels will owe gratitude to Mr. Kamenka for giving them the benefit of his pioneering work.

ARTHUR C. HOLDEN

New York City.



Farming and Democracy. A. Whitney Griswold. Harcourt, Brace and Company. 1948. Pp. ix, 214. \$3.00.

The focal point of this well-documented volume is the relation of family farming to democratic political theory. The political values commonly associated with family farming are traced to the ideas of Jefferson, the Physiocrats and Locke. The author finds

significant differences between the family farm as an American ideal and as a going concern. These differences are accounted for by the impact of economic progress on an agriculture which failed to adapt its resources to the demands of a dynamic economy because of political power, agrarianism and democratic political theory. Perhaps few economists would accept this as a reasonably complete explanation. Any mention of the trade cycle and its affects on the equilibrating process is conspicuously absent.

The author examines the proposition that the growth of democracy is dependent upon the preservation of family farming. For evidence the experience of England and France is reviewed. It is apparent that family farming is neither a necessary nor sufficient condition for democracy. Its preservation, as the author points out, has been an objective of policy in many countries, democratic and authoritarian alike. Democracy has grown in England where agriculture and the family farm have become mere appendages of an industrial economy. In France family farming with its complete disregard for economic efficiency has been associated with the growth of democratic institutions. In the countries of eastern and southeastern Europe, family farming has failed to produce any flourishing democracies.

While the author contends that there is no magic guarantee of democracy inherent in family farming, it is his belief that the family farm should be preserved, and apparently because of its relation to democracy. "Its strongest claim on democracy, the one by which it will stand or fall as democratic political theory, is this: . . . it is still the outstanding form of individual economic enterprise." In view of the author's previous arguments on some interpretations this comes close to contradiction.

The difficulty lies in the failure of the author to discuss the nature and meaning of democracy. In a book which purports to deal with democratic political theory this is a little surprising. Democracy means different things to various people. Its nature is far from self-evident. Apparently the author's conception involves a particular form of economic organization. If so, his political theory has an economic ring to it. Furthermore, if we accept the literal meaning of "individual economic enterprise" as referring to single proprietorships, have we been losing

democracy with the growth of partnerships and corporations? On the other hand, if the term means all private as contrasted with public economy, do the people of a community lose democracy by voting to establish a local light plant? Questions of this kind go to the heart of some of the important problems of the day. It doesn't appear that the author's democratic political theory can effectively handle them.

In the last two chapters, the author reviews the growth of government aid to agriculture and the role of farm organization in achieving their economic ends. The manner in which political power has been used without regard to the general welfare is criticized and quite justifiably so. While the author raises this very fundamental problem, he fails to deal with it in constructive terms. Perhaps he will turn his attention to this at a later date. In spite of these critical comments, the book is a significant addition to the small but growing body of literature dealing with the political and sociological aspects of agricultural policy. It should prove to be of interest to all those who find in agricultural policy a challenging and stimulating study.

DON KALDOR

Iowa State College



Land Classification for Land Use Planning. By G. V. Jacks. Harpenden, England: Imperial Bureau of Soil Science, Technical Communication No. 43, 1946. pp. 81, biblio. & appen. \$0.80.

This bulletin presents in summary form the major types of land classification in use throughout the world. Written primarily for agriculturists, economists also will find much of interest here. It might have been well for us had the study arrived in America sooner for it clears up some of the problems over which American agricultural economists struggled from 1930 to 1940 without conspicuous success.

Perhaps the report will arouse interest in the serious study of classification methods and techniques, particularly by graduate classes. There is genuine need for practical classification work applicable to conditions in the United States as well as in the many coun-

tries where the United Nations is trying to help with agricultural restoration and new land development. Agricultural missions returning from Greece, China, Syria and other countries stress the need for land surveys and classifications. Physical and economic land data worked into an orderly and understandable pattern (the essence of all classifications) are essential if the resources of backward areas are to be made more productive of food for local use and of products for trade.

This report of the Imperial Bureau of Soil Science makes clear that there is no such thing as a satisfactory all-purpose or general-purpose land classification. To be useful any classification of land must be made for a definite purpose, and researchers must be aware of the purpose. This does not mean that the several types of classifications do not have features in common. "Soil conservation," Jacks states (p. 3), "is the physical objective of all agricultural land-use planning, and provides a common basis for the formation of certain general principles of land classification." The determination of production, use, and services that will yield the greatest combined benefits for society is the second underlying objective of all classifications for land-use planning.

Much of this English study is devoted to methods of land classification developed and in use in the United States. The soil survey, the physical surveys of the Soil Conservation Service and the Tennessee Valley Authority, as well as the land classifications developed by several state agricultural colleges, such as the New York and Michigan classifications, are presented in considerable detail. Readers familiar with the summary report on land classification prepared by the National Resources Planning Board will find little that is new here. Jacks' study, however, is brief and parts of it are more clearly presented than in the former report.

English agriculturists have been quick to recognize that the modern soil survey, as it is developing in the United States, is becoming more of a land and less of a soil classification. They believe that this will greatly increase its practical value. American agriculturists need to give more thought to the evolution which has taken place in soil survey and classification work. Kellogg's contribution looms larger in this English study than in many American discussions. The work of the Soil

Conservation Service is fully reported. Admirable restraint is used in discussing the classifications built around soil erosion.

Various methods of estimating relative productivity of soils, as the Storie index, the rating system used in Saskatchewan and Alberta, and the German soil ratings (Bodenbonitierung) are discussed briefly. No attempt is made to develop a method or to select the more useful of the techniques proposed. It is entirely a review of methods and ideas developed by others.

Although land classifications date back to ancient times it has apparently been difficult to develop sustained interest or cumulative experience in this field. Marschner¹ explains this on the basis of the difficulties inherent in the process of finding a common denominator for the fractional influences created by a group of dissimilar variables (each of which is thought to be an essential element in the classification). It is clear from the present study that this is the stumbling block and that it is likely to impede progress for some time toward the development of a land classification that will have wide application.

Many economists have been amused at the fumbblings of land classifiers without realizing the real difficulties inherent in their task. The strictly physical classifications have offered difficulties enough. But real trouble commences in trying to bring in enough economics to make the physical data useful. The complications can be imagined when we realize, as Marschner has observed, that,

"Even physical characteristics which, as a rule, detract from the use value of land may at times have their economic compensations. In south central Texas, for instance, the average yield of cotton decreases with the decrease in the average amount of rainfall in the transition zone from the humid to the subhumid region. The higher yields in the humid zone require, however, a greater input of fertilizers on account of soil leaching than the lower yields in subhumid portions where cotton is grown with little or no soil amendments."

Land classification specialists continue to work with a mixture of facts and opinions. Flexible and enquiring minds are required to

advance the subject toward both scientific and practical goals.

"That land classification as an instrument of planning future National development cannot wholly remain a subjective appraisal of land quality is usually recognized. Our experience with the trial and error method in land development and land settlement, which frequently represented individual appraisal of land quality in an extremely loose application has demonstrated that the palpable errors of individual judgment are frequent where land is concerned. Although individual judgment can be supported now by a great many ascertained and recorded facts, the available factual information is far from being complete or of uniform value. Moreover, in view of the complexity of the correlating process, and the need for a practical applicable system of land classification, a subjective element in the appraisal or classification can hardly be avoided altogether. This being the case, the aim should be to reduce the leeway of probable errors due to individual judgment as much as possible, and confine them to a comparatively narrow channel by establishing guide posts or orientation. This would seem to be one avenue of approach that holds promise of being practical in its application."

All too often has there been a tendency to deny the element of subjectivity in classification work. This leads to all sorts of errors and frustrations. Once the subjective element is admitted it can be analyzed and controlled. It is unfortunate that Jacks did not give more space to the subjective elements in the classifications he describes. They appear in all of the studies he reviews.

The part played by farmers in making land classifications is mentioned several times. "A unique feature of land-use planning [is thought to be] that the people not only make and execute the plan, but themselves constitute one of the chief things to be planned." (p. 6) In emphasizing the need to keep land classifications as simple as possible the author makes some odd statements, as when he says, ". . . from the practical standpoint more is usually gained than lost by using a classification that does not need, and sometimes will not bear, thinking about."

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¹References to Marschner are from unpublished memorandum: Comments on Factorial Analysis of Basic Land Classification Factors as proposed by R. W. Harrison, April 12, 1944.

Editor's Notes

Forestry in the Northern Rockies. Transmission poles are fast becoming a major forest industry in the Northern Rocky Mountain Region. Over 817,000 poles were produced in 1947 and this is a fifteen percent increase over the previous year and the highest on record. Some fifteen hundred men are engaged in this five-million-dollar-a-year industry. Last year the production almost doubled what it was before the war.

Lodgepole pine was the big species last year as well as in 1946. It made up nearly half of the total poles produced. This is in decided contrast to cutting prior to the war when only a few lodgepole pine poles reached the market from the Northwest. Western Larch is emerging as a second promising newcomer, making up more than a fourth of the 1947 cut. Cedar, the prime pole of long standing throughout the country, declined in production slightly from its 1946 quota. This slight drop is attributed to the growing scarcity of accessible cedar stumpage.

Nearly one fourth of the country's pole supply can be found in the forests of the Northern Rocky Mountain Region. Therefore, it is not surprising that the regional pole cut, according to survey estimates made, could be more than three times the 1947 output, providing good cutting practices are followed. However, and this is vital factor, a substantial access road program would be needed to realize much of the proposed increase from back-forest areas.

These facts have been gleaned from a re-

port released early in 1948 by the Northern Rocky Mountain Forest and Range Experiment Station at Missoula, Montana. This report analyzes a survey made by the Northern Rocky Mountain Forest and Range Experiment Station in cooperation with the Rocky Mountain Pole and Treating Association.

What Is an FAO Mission? An FAO mission is a group of experts, usually drawn from several countries, which goes to a country or region to study at first hand a given problem or group of problems related to food, agriculture, forestry, or fisheries. On the basis of such a study, it makes recommendations for action by the government or governments concerned. Recommendations may also be made for action by FAO (Food and Agriculture Organization of the United Nations) and other international organizations. No mission is sent to any country except on request of its government and after determination by the Director-General of FAO that it is feasible and worthwhile.

Among the FAO mission reports now available or in process of publication are: Report of the FAO Mission for Poland (May 1948) 154 pages, \$2.00; Report of the FAO Mission for Greece (March 1947), 188 pages, \$1.50; Report of the FAO Mission for Siam (in preparation); and Report of the Special FAO Mission for Venezuela (in preparation). Sales agent in the United States for these reports is Columbia University Press, International Documents Service, New York 27, N. Y.

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